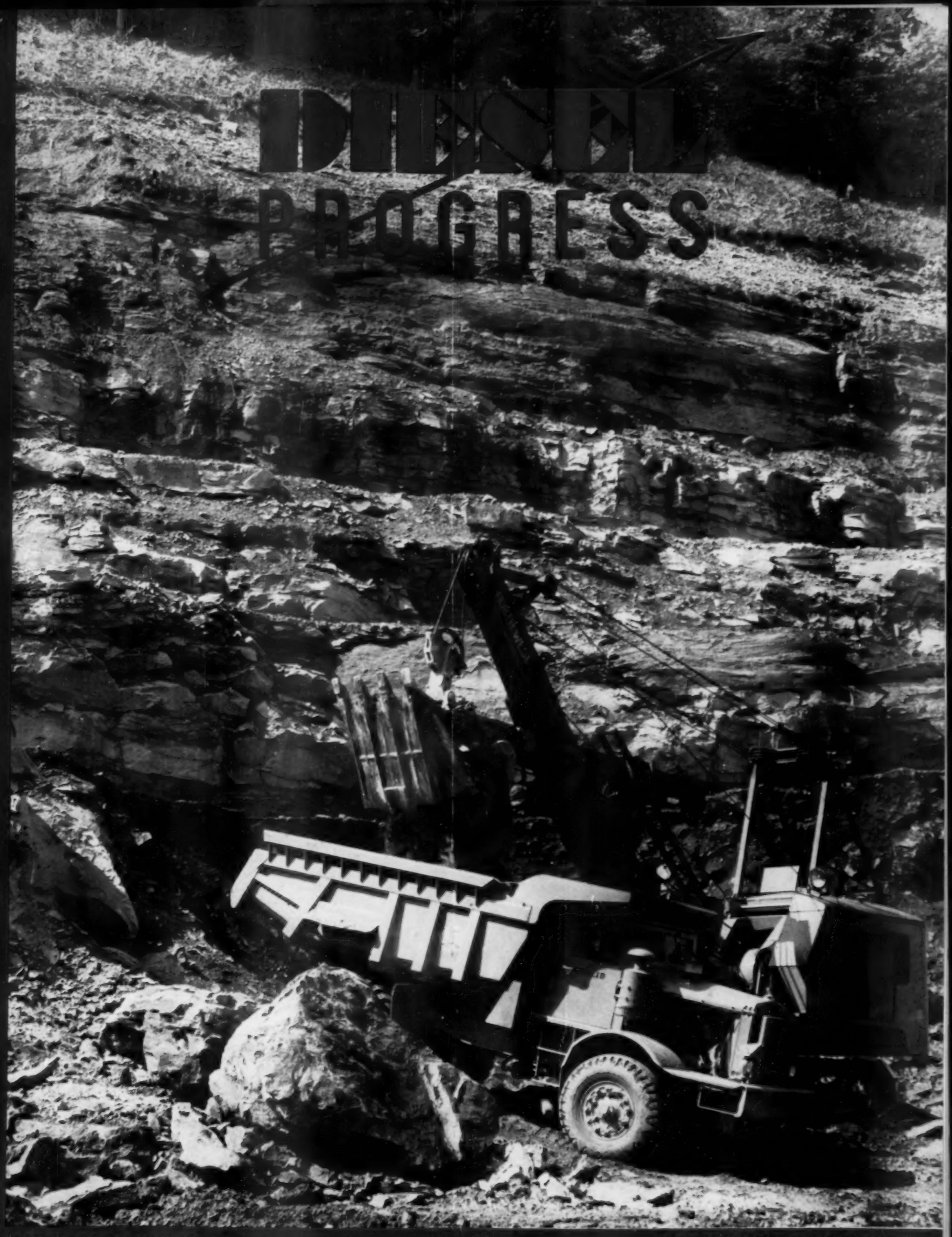
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



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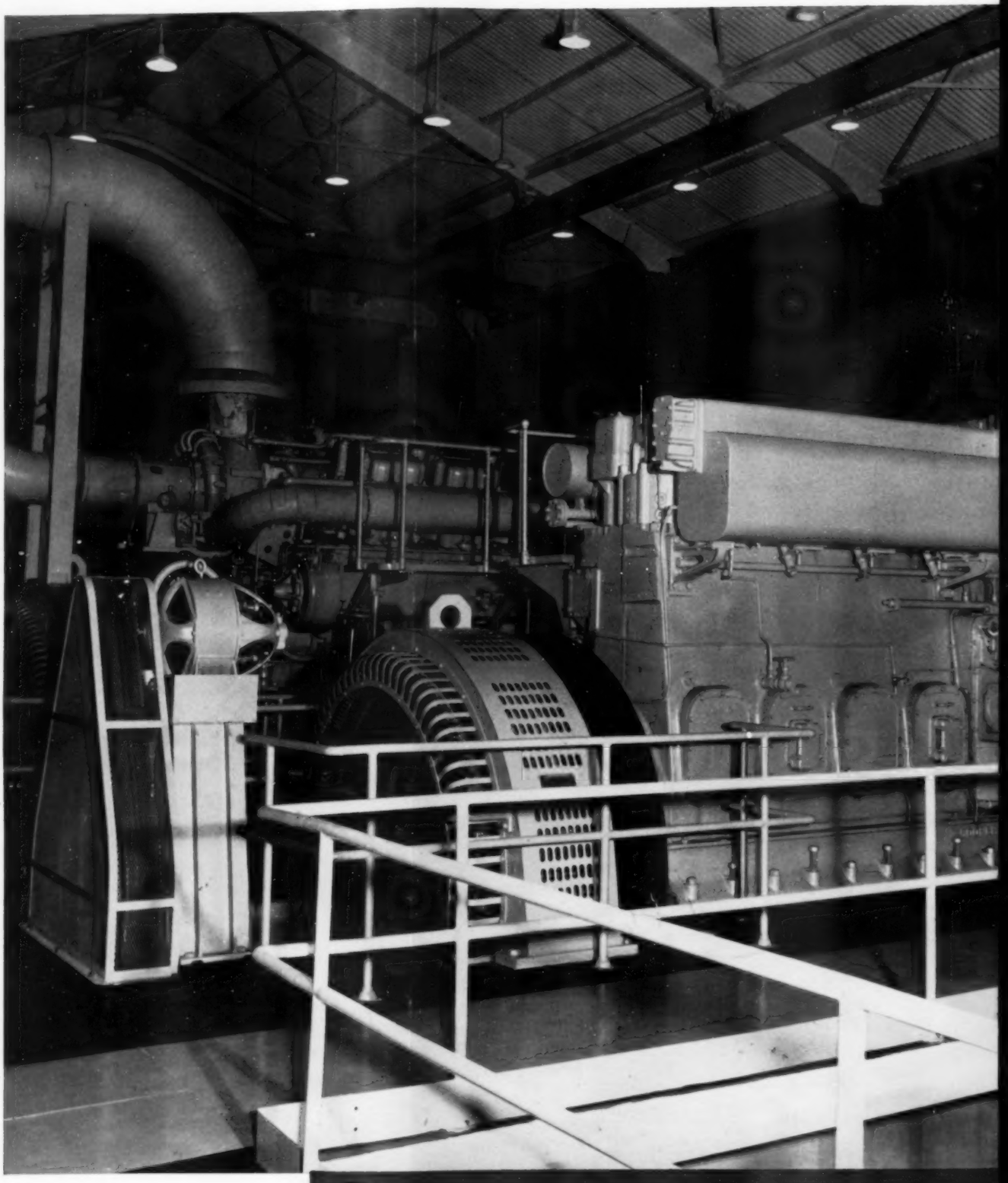

TUNE IN:
METROPOLITAN
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radio broadcasts
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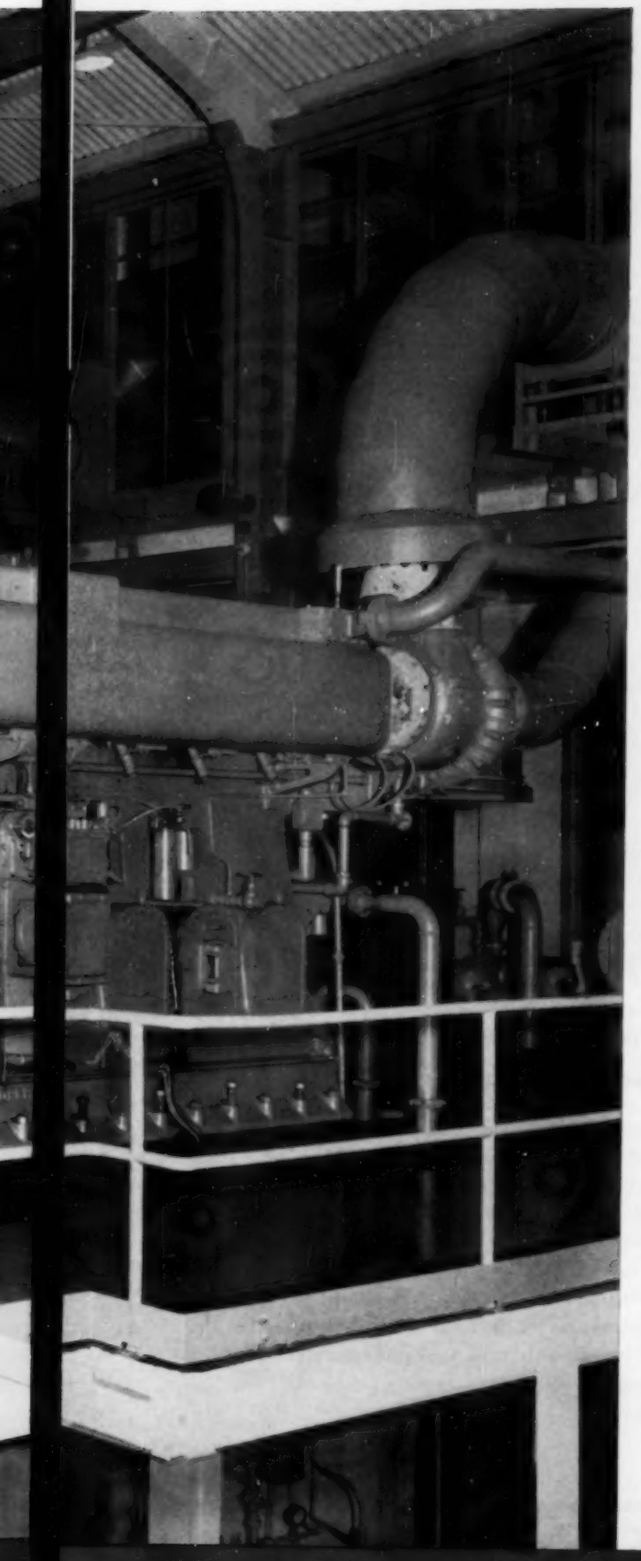


POWER PLANT OPERATORS REPORT:

MORE POWER from TEXACO LUBRICATED ENGINES

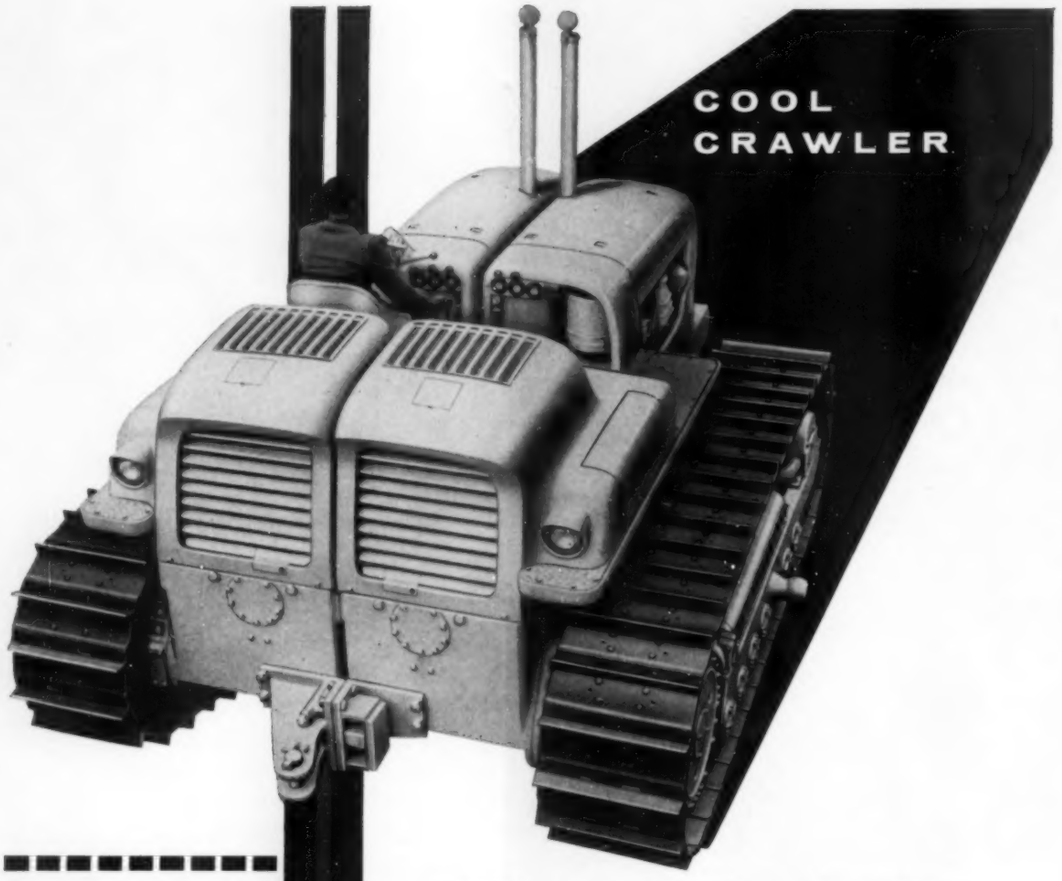
According to actual case history reports, power plant engines show a power performance improvement when lubricated with *Texaco Ursa Oils*. This is because *Texaco Ursa Oils* 1) help keep rings free for full-power compression and complete combustion, 2) resist oxidation and sludging, 3) prevent harmful deposits, 4) reduce wear.

There is a complete line of *Texaco Ursa Oils*, designed and processed especially to make diesel, gas, and dual-fuel engines deliver *more power* with *less fuel* and *longer periods* between overhauls.

For over 20 years, more stationary diesel horsepower in the U. S. has been lubricated with Texaco than with any other brand.

Your Texaco Lubrication Engineer will give you full information. Just call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES



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MADE
TO
ORDER

"EUC" TC-12 Handles Any Job . . .
And Harrison Handles The Heat!

This Twin Crawler takes it cool . . . as Harrison cracks down on the heat! Pulling heavy construction equipment or moving the earth at top speeds . . . Harrison holds the line on heat. That's why Euclid specifies Harrison oil coolers. They know that for the long haul Harrison heavy-duty, high-capacity cooling equipment can't be beat. They know from long experience that Harrison products are engineered and built for dependable, durable, economical service. In fact, Harrison heat control products are backed by more than 45 years of research and manufacturing experience. If you have a cooling problem, look to Harrison for the answer.

GM GENERAL MOTORS

HARRISON

RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N.Y.

DIESEL and GAS ENGINE PROGRESS

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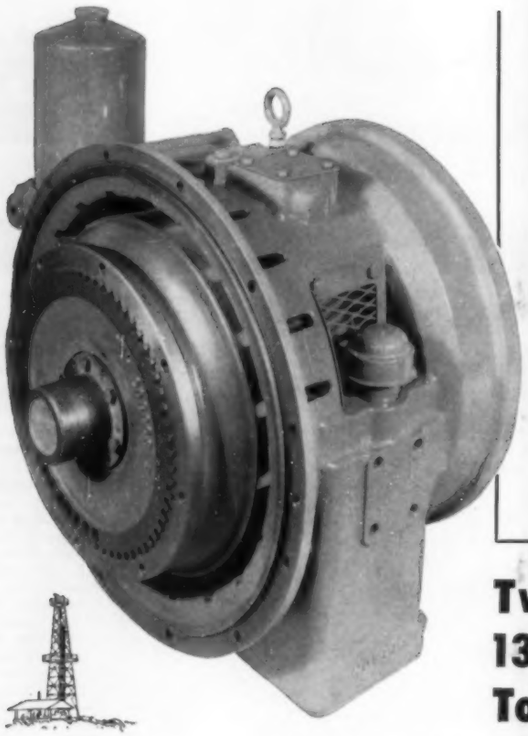
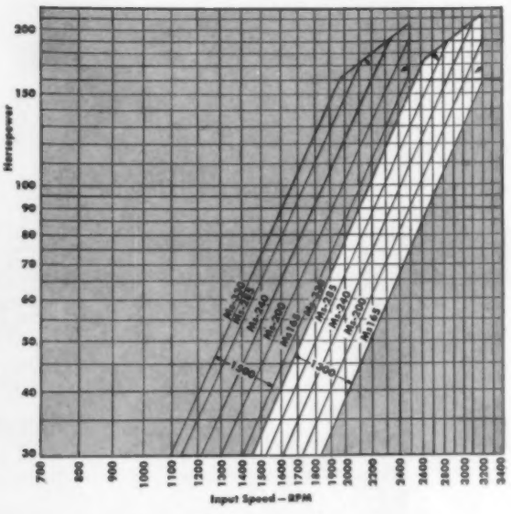
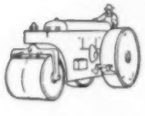
FRONT COVER ILLUSTRATION

A Euclid dump truck powered with a GM diesel is being loaded by a Northwest shovel driven by a Hercules diesel on the West Virginia Turnpike roadbuilding project.





Twin Disc offers new 1300 Series Single-Stage Torque Converters



To meet the growing trend toward higher speed diesel and gasoline engines, Twin Disc Clutch Company announces its new 1300 Series Single-Stage Torque Converters . . . a series that offers ideal torque ratings for shovels, materials handling equipment, small industrial locomotives, front-end loaders, hoisting machinery, road rollers, graders and many similar applications.

The new 1300 Series Single-Stage Torque Converters are rated from 30 hp at 1450 rpm to 212 hp at 3200 rpm . . . with impellers available for specific torque ratings of 165, 200, 240, 285 and 330 pound-feet.

Current production of the 1300 Series consists of one model—the Model "F." This is a spacer-type arrangement with an SAE No. 2 flywheel housing size and either an SAE No. 2 or No. 3 output housing.

Like the Twin Disc 1500 Series Single-Stage units, the 1300 Series has an exclusive blade design which develops a counter-head at high-speed ratios, stopping fluid circulation. This simplifies design and construction and eliminates the need for a free-wheeled stator.

Impellers having different bladings (both number of blades and pitch) are interchangeable, permitting torque capacities to be matched more accurately to engines of various hp sizes and speeds.

The 1300 Series cooling requirements are minimized because of a rotating impeller housing which provides air circulation through the ventilated stationary housing.

If you've been considering a torque converter in your machinery designs, or are dissatisfied with your current single-stage units, investigate today the benefits offered by the new Twin Disc Single-Stage Torque Converters. Write for Bulletin 508 Supplement.

TWIN DISC

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
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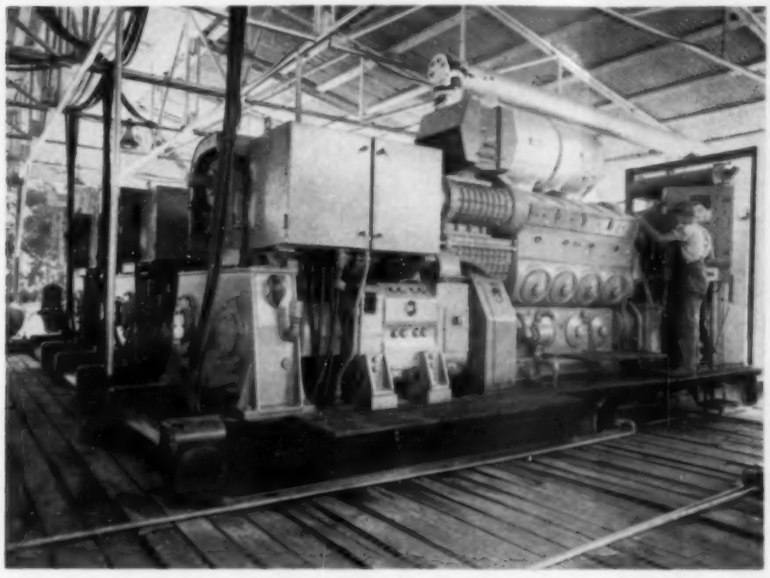
It's Diesel-Electric for Shell on Cote Blanche Island

Portable, rapid-setup Electro-Motive Power choice for big rig in rugged Louisiana swamp



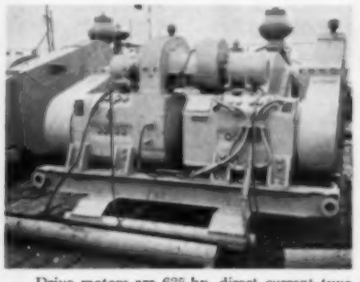
To work the swampy Cote Blanche Island field, Shell Oil Company faced two opposing requirements for their Rig 11. First, the rig had to be big, with power to drill over 18,000 feet. And second, it had to be easily portable to enable movement over primitive roads.

Shell's decision to use Diesel-Electric was influenced by the fact that this type power permits gathering almost all equipment into easy-handling, skid-mounted packages. In spite of rough terrain, rig-up can be completed in record time.

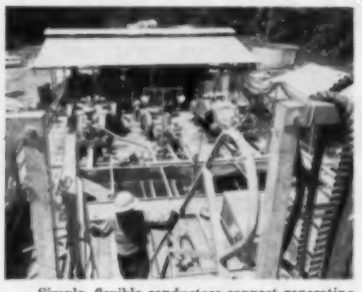
Electric conductors running from generating units to drive motors provide flexibility in locating equipment to suit conditions. This design avoids clutter, reduces rig-up and rig-down time and makes a big rig far more economical to move. Also, with few modifications, equipment can be adapted for offshore drilling.

Three Electro-Motive SR-8, 875-hp. Diesel generating units driving nine 625-hp. d.c. motors provide the drilling power for Rig 11. Its first hole is scheduled for 18,500 feet, using a 14,000 foot, 9⅝ in. protective string. It takes big power to drill below the overhang of the salt dome in this area, and this rig has it.

Electro-Motive Power is adaptable to many different types of drilling devices on land or water. For complete details on how it might fit your own particular requirements, contact your Electro-Motive representative.



Drive motors are 625-hp. direct current type for smooth, rapid acceleration of loads and positive control of speed and torque. Each main pump has two 625-hp. motors for a total of 1,250-hp.



Simple, flexible conductors connect generating sets to drive motors, allowing complete flexibility of arrangement. Rig-up time is reduced considerably because components are located to fit the site.

Driller's control is located next to draw works. From a central position, driller has control of Diesel-Electric equipment, including engine speed, pumps, hoist, rotary table and safety shutdown.

Derrick on Rig 11 is a big one—147 feet. It was modified for platform drilling, but can be extended to 189 feet.

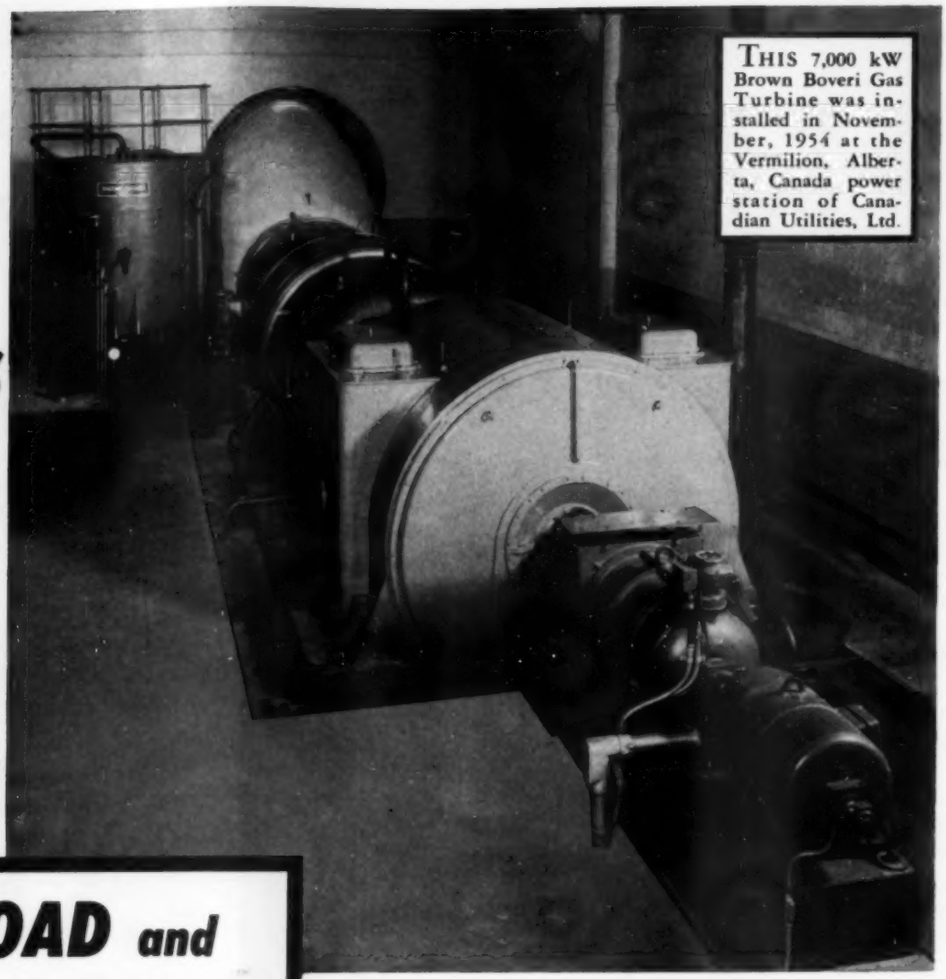
ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS

In Canada: General Motors Diesel Limited, London, Ontario

Petroleum Industry sales offices: Tulsa, Oklahoma; Houston, Texas; Dallas, Texas; Morgan City, Louisiana; Pasadena, California.

for Faster Start-ups and Greater Economy



THIS 7,000 kW Brown Boveri Gas Turbine was installed in November, 1954 at the Vermilion, Alberta, Canada power station of Canadian Utilities, Ltd.

in PEAK LOAD and BASE LOAD SERVICE

BROWN BOVERI

single shaft, 7,000 kW, open cycle

GAS TURBINES

THE Brown Boveri 7,000 kW single shaft gas turbine is the answer to the rigid demands of *Peak Load* service. Relatively no warm-up time is required . . . full load can be reached in 15 minutes or less.

In-the-field performance records of over 50 such units — in peak and base load service throughout the world — prove their economy of operation. They require a minimum of manpower and maintenance; they burn any gaseous or liquid fuel; and they effect economies in building construction, foundations and overall capital outlay.

Whether yours is the problem of peaking or base load service in a public utility, cooperative, or industrial power plant, you'll find it profitable to investigate Brown Boveri Gas Turbines.

BROWN BOVERI

BROWN BOVERI CORPORATION

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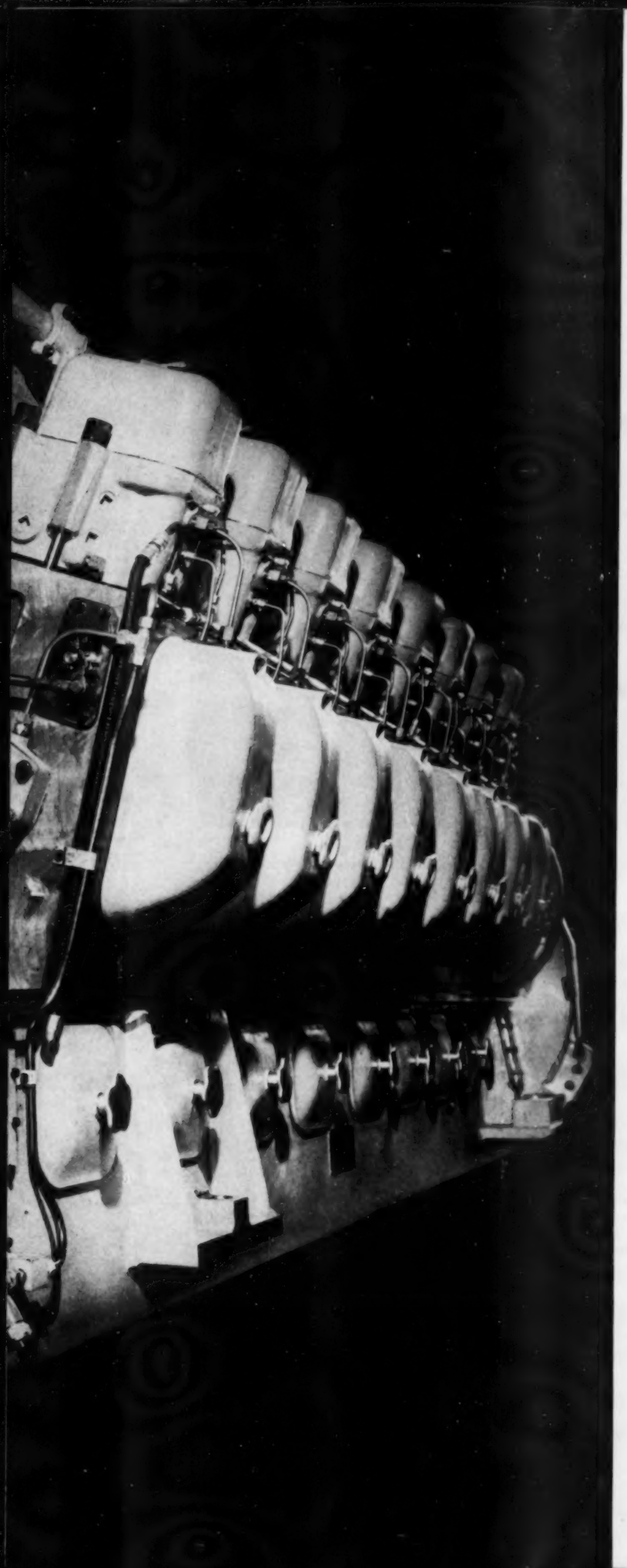

ALCO TRIMS WEIGHT BOOSTS POWER CUTS COSTS IN MODERN 251 DIESELS

The ALCO 251 diesel is made for today's requirements of stationary service. Its base and block are rugged weldments for lower weight, higher strength than old-time castings. Four-point mounting eliminates grouting and heavy foundation costs. Use of modern proven materials in the power section extends the life of the 251 diesel, too, and maintenance is easier and less costly.

More power per pound is provided by improved fuel injection, modern turbosupercharging plus an air aftercooler. The basic 251 diesel can be easily adapted to any stationary service by simply adding standard parts, including dual fuel, and it is especially suitable for automatic or remote operation.

ALCO's regional warehouses—seven located throughout the country—give speedy service on parts orders. This, plus the fact that all models of the 251 diesel have interchangeable parts, means that your parts inventories can be kept low.

If you would like more information on the advantages of the ALCO 251 diesel, contact your nearest ALCO sales office, or, if you wish, write for Bulletin DE-6 to Transportation Products Division, Dept. TR-3, P. O. Box 1065, Schenectady 1, N. Y.

Condensed Specifications for ALCO 251 Diesels

No. Cyl.	Bore and Stroke (in.)	RPM Range	BHP Range	Approx. Wt Dry (lb)
6	9 x 10½	350-1000	550-900	22,100
12	9 x 10½	350-1000	1100-1800	32,630
16	9 x 10½	350-1000	1470-2400	42,000

ALCO

ALCO PRODUCTS, INC.

NEW YORK

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ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM C. H. LAWSON, INC.

Using RPM DELO Oil heavy-duty engines outlast equipment

C. H. Lawson, Inc. operates 78 pieces of road building equipment ranging from new to 15 years old, all using RPM DELO Oil. Only one engine has ever required major overhaul and that was not due to lubrication. Firm's chief mechanic, E. C. Miller, says, "RPM DELO Oil has been used exclusively in all our heavy duty engines since 1944. In many cases, it has enabled engines to outlast the equipment." Euclid Earth Mover (above) gets a push from a bulldozer to provide extra traction in wet earth.

TD 24 International (left), one of firm's 12 bulldozers, helps clear the way for a Route 50 by-pass at Riverdale, Maryland. This two year old tractor has operated more than 4,000 hours without engine repairs. Company owner, C. H. Lawson (right), reports that RPM DELO Oil keeps the engines in his equipment in such good shape that—regardless of operating conditions—they average approximately 4 years or 10,000 hours service before even minor repairs are required.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrorosion of bearing metals
- Inhibitor resists crankcase foaming

For More Information or the name of your nearest distributor, write or call any of the companies listed below.

LUBRICATING OILS RPM DELO

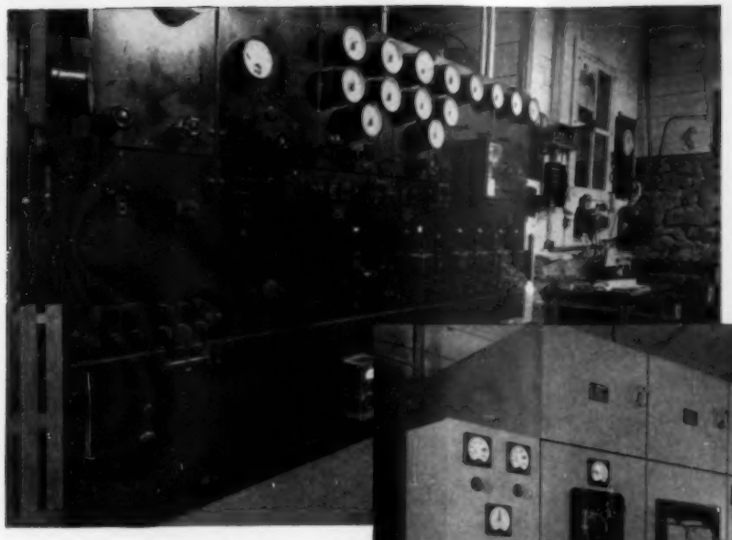
TRADEMARK "RPM DELO" AND DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso

THE CALIFORNIA COMPANY, Denver 1, Colorado



◀ Old

Old switchgear at Big Falls, Minnesota hydroplant of Border Counties Power Cooperative, Inc. System expansions had caused this board to become dangerous by today's standards, capacity insufficient, and increasingly tedious to handle.

New ▶

Custom-designed by E-M from standard components, this new switchgear at Big Falls gives extra safety and convenience. All apparatus is completely enclosed, yet readily accessible because of E-M's specially designed Swing-Door Instrument Panels. Operation, inspection, and testing is safe, convenient, and simple.

Making switchgear meet power system expansions

● Power systems grow larger . . . and larger . . . and larger. Electrical apparatus of all types must keep pace with this rapid expansion. The plant switchgear, with its vital safety and control functions, must be closely matched to increased demands made upon it.

At Border Counties Power Cooperative, Inc., size of the system *tripled*. Having had previous experience with E-M's personalized engineering assistance and with the safety and service of E-M designed apparatus, they called on E-M engineers to work out the new switchgear with consulting engineers R. D. Thomas and Associates.

Equipment necessary to handle the greatly increased system had to be fitted deftly into available space. This made E-M's Swing-Door Instrument Panel a natural choice, as this panel makes use of every available inch of space, both on door and interior of cabinet. Mounted on hinges, the Swing-Door Panel opens as a door to reveal a compact, easy-to-reach arrangement of components, all accessible without reaching across buses or terminals. The E-M Switchgear is designed for tomorrow's increased loads as well, with breakers of adequate interrupting capacity.

"Personalizing" of E-M Switchgear, as was done at Big Falls, means that each E-M board is *matched exactly* to what it will encounter in daily service. This complete, attentive, and highly specialized E-M engineering can be of service to you. Call your nearest E-M sales engineer for more facts, and be sure to write the factory for E-M Switchgear Publication No. 194.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

Specialists in **MODERN SWITCHGEAR DESIGN**

E-M

4200-TPA-2163

NORDBERG

"standby" Diesel increases steam plant efficiency . . . cuts operating costs

HERE in Woodstock, Illinois, residential customers and industry alike depend solely on the municipal plant for power. "*It's a big responsibility*," states William H. Day, City Manager at Woodstock, "*and the principal reason why this city recently diversified its power generating equipment.*" Now on the line, in a plant previously powered by three steam turbines, is a 3660 hp, 2610 kw Nordberg *Supairthermal*® Duafuel engine. Its addition increased plant capacity to 16,610 kw . . . more than double peak demand.

The Nordberg engine was purchased as a standby unit to quickly supply the total residential power needs in case of boiler or turbine failure and to handle peak load conditions. The new *Supairthermal* engine has fulfilled all these needs and more . . . it has demonstrated its dependability and economy to such an extent that it has become a base load unit during the summer months. It generates about 10 per cent of the monthly production of over three million kwh, and is helping to lower costs of the entire power plant operation.

Woodstock's experience is added proof of the ability of Nordberg engines to provide reliable, low cost power for municipal and industrial service. Write for information on Nordberg engines to meet your specific power requirements . . . in sizes to over 12,000 hp.

NORDBERG MANUFACTURING COMPANY, Milwaukee, Wisconsin

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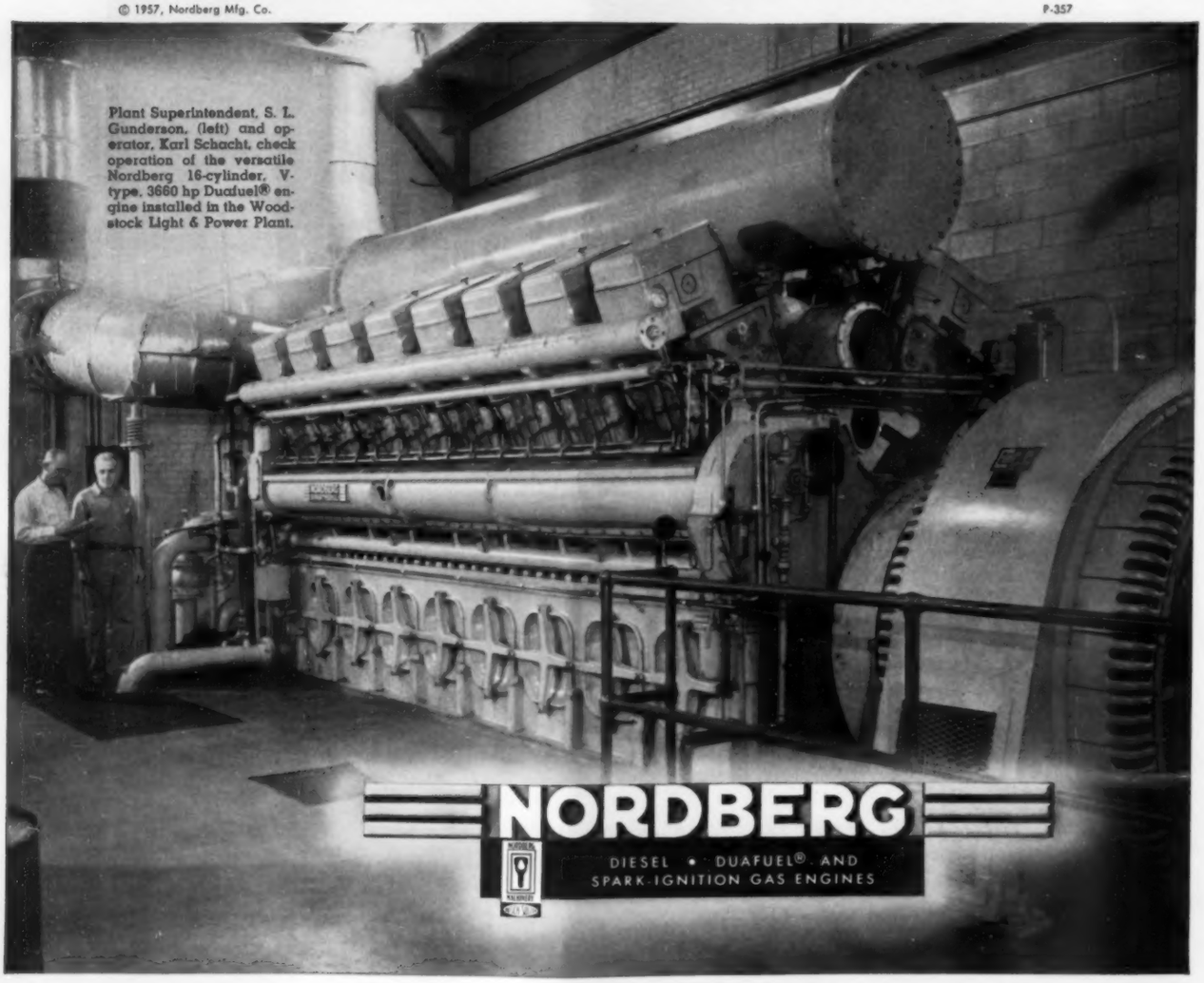
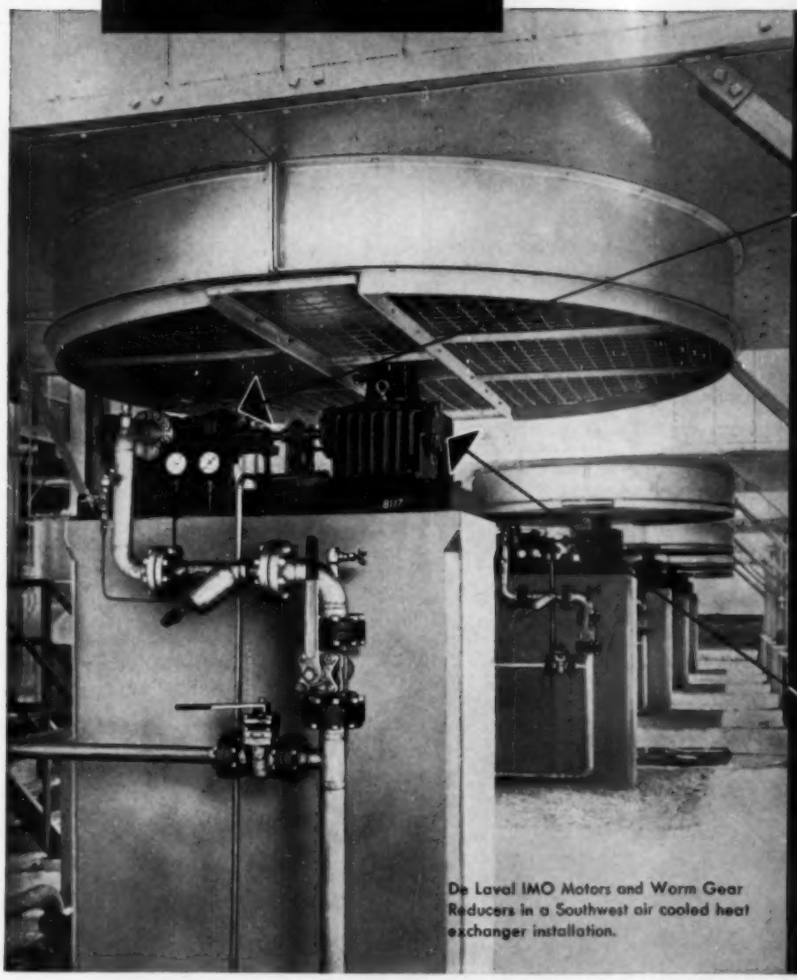


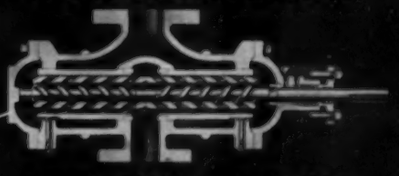
Plant Superintendent, S. L. Gunderson, (left) and operator, Karl Schacht, check operation of the versatile Nordberg 16-cylinder, V-type, 3660 hp Duafuel® engine installed in the Woodstock Light & Power Plant.

DE LAVAL
HYDRAULIC FAN DRIVES

do dependable, power-saving job in air-cooled cooling towers

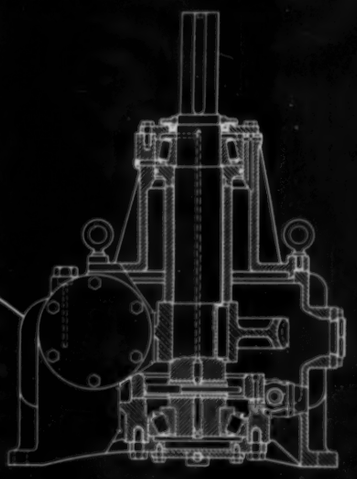


De Laval IMO Motors and Pumps



simple, reliable, pulsation-free

De Laval Worm Gear Speed Reducers



ruggedly built for severe service

De Laval IMO Motors and Worm Gear Reducers in a Southwest air cooled heat exchanger installation.

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers *save power* since the fan operates at full speed only a portion of the time. Furthermore, there is no demand charge on hydraulic power. • Equally important, they provide *accurate, automatic* control of engine jacket water temperature, and also assure *complete operational flexibility*. Due to the simplicity of De Laval IMO motors and pumps as well as the rugged construction of De Laval Worm Gear Reducers, these units stay on the job for years. Both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

Investigate *all* the advantages of De Laval Hydraulic Fan Drives. Send for your copy of Bulletin 3009 which includes helpful performance data.

DE LAVAL *Hydraulic Fan Drives*

DE LAVAL STEAM TURBINE COMPANY
883 Nottingham Way, Trenton 2, New Jersey

DL370

NEW TEAMWORK IN

DIESEL ENGINE

DESIGN AND PRODUCTION

Last year American MARC Inc. purchased the Diesel Division of Hallett Manufacturing Company, national leader in development and production of low-horsepower Diesel engines (especially in the air-cooled field).

The goal of this combination of two great firms was to make better lightweight Diesels for less money—an end that has already been accomplished after only a few short months!

Today the position of the American MARC-Hallett team is stronger than ever. Foreign competition in both quality and price is now met successfully by American MARC's modern mass-production techniques in the manufacture of rugged, reliable, truly All-American Diesel engines.

Scores of improvements have made standard Hallett models into revolutionary new engines. This is true particularly in the case of the air-cooled 6 HP AC1, midget prime mover adaptable to almost any application—from generators to trackless ore cars.

If you need a husky small Diesel for industrial or marine use where extra lugging power is desired, write today to American MARC for free literature and specifications on these fine engines, with their small size, low cost, and modern refinements.

AMERICAN MARC INC.

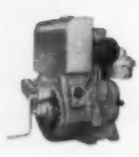
ENGINES OF QUALITY

1601 West Florence Ave., Box 549, Inglewood, Calif. • Telephone OR.8-7174

SOME desirable sales territories are still open.
Inquiries are invited from representative dealers.

- ★ **Air or Water Cooled; 5.5 to 25 hp**
- ★ **All-American, from basic materials to completed engines**
- ★ **Available as portable power units, generating plants, pumping units, or for marine propulsion**

6-101

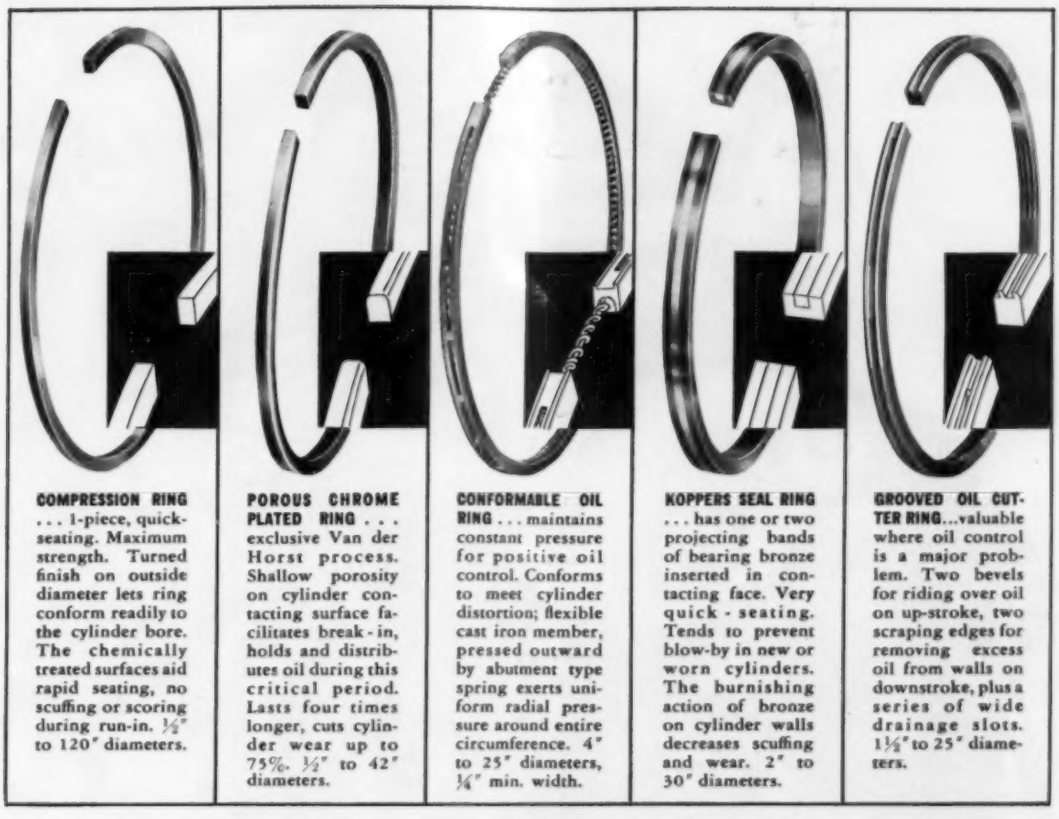


Model WC-1, one-cylinder, water-cooled, 4-cycle, 6 HP @ 1800 RPM. Wt.: 220 lbs.

Model A1Q-3KW, one-cylinder, air-cooled, 4-cycle, 3KW @ 1800 RPM. 6-7 HP

Model AC-2, two-cylinder, air-cooled, 4-cycle, 14 HP @ 1800 RPM. Wt.: 350 lbs.

Model AC-1, one-cylinder, air-cooled, 4-cycle, 6 HP @ 1800 RPM. Wt.: 220 lbs.



COMPRESSION RING . . . 1-piece, quick-seating. Maximum strength. Turned finish on outside diameter lets ring conform readily to the cylinder bore. The chemically treated surfaces aid rapid seating, no scuffing or scoring during run-in. ½" to 120" diameters.

POROUS CHROME PLATED RING . . . exclusive Van der Horst process. Shallow porosity on cylinder contacting surface facilitates break-in, holds and distributes oil during this critical period. Lasts four times longer, cuts cylinder wear up to 75%. ½" to 42" diameters.

CONFORMABLE OIL RING . . . maintains constant pressure for positive oil control. Conforms to meet cylinder distortion; flexible cast iron member, pressed outward by abutment type spring exerts uniform radial pressure around entire circumference. 4" to 25" diameters, ¼" min. width.

KOPPERS SEAL RING . . . has one or two projecting bands of bearing bronze inserted in contacting face. Very quick-seating. Tends to prevent blow-by in new or worn cylinders. The burnishing action of bronze on cylinder walls decreases scuffing and wear. 2" to 30" diameters.

GROOVED OIL CUTTER RING...valuable where oil control is a major problem. Two bevels for riding over oil on up-stroke, two scraping edges for removing excess oil from walls on downstroke, plus a series of wide drainage slots. 1½" to 25" diameters.

Five Koppers Rings . . . worth their weight in gold!

What will American Hammered Industrial Piston Rings *do for you?* They'll save you money on fuel, on lubricating oil, on labor costs—by reducing down-time.

They'll maintain high compression, improve your operation, give you *much* longer service. They don't cost much . . . but they have over 35 years of manufacturing skill and accumulated experience behind them. They never let you down, they never fail in the jobs they're designed to do—and hundreds of satisfied users will tell you that, despite their low cost, Koppers rings *are* worth their weight in gold.

American Hammered Piston Rings are available in all types, all sizes—from ½" to 10' diameter—for every purpose. Koppers makes American Hammered Rings for all kinds of industrial equipment, can recommend without bias as to types. It costs nothing to consult Koppers—for illustrated Piston Ring booklet write to KOPPERS COMPANY, INC., *Piston Ring & Seal Dept.,* 1403 Hamburg Street, Baltimore 3, Md.

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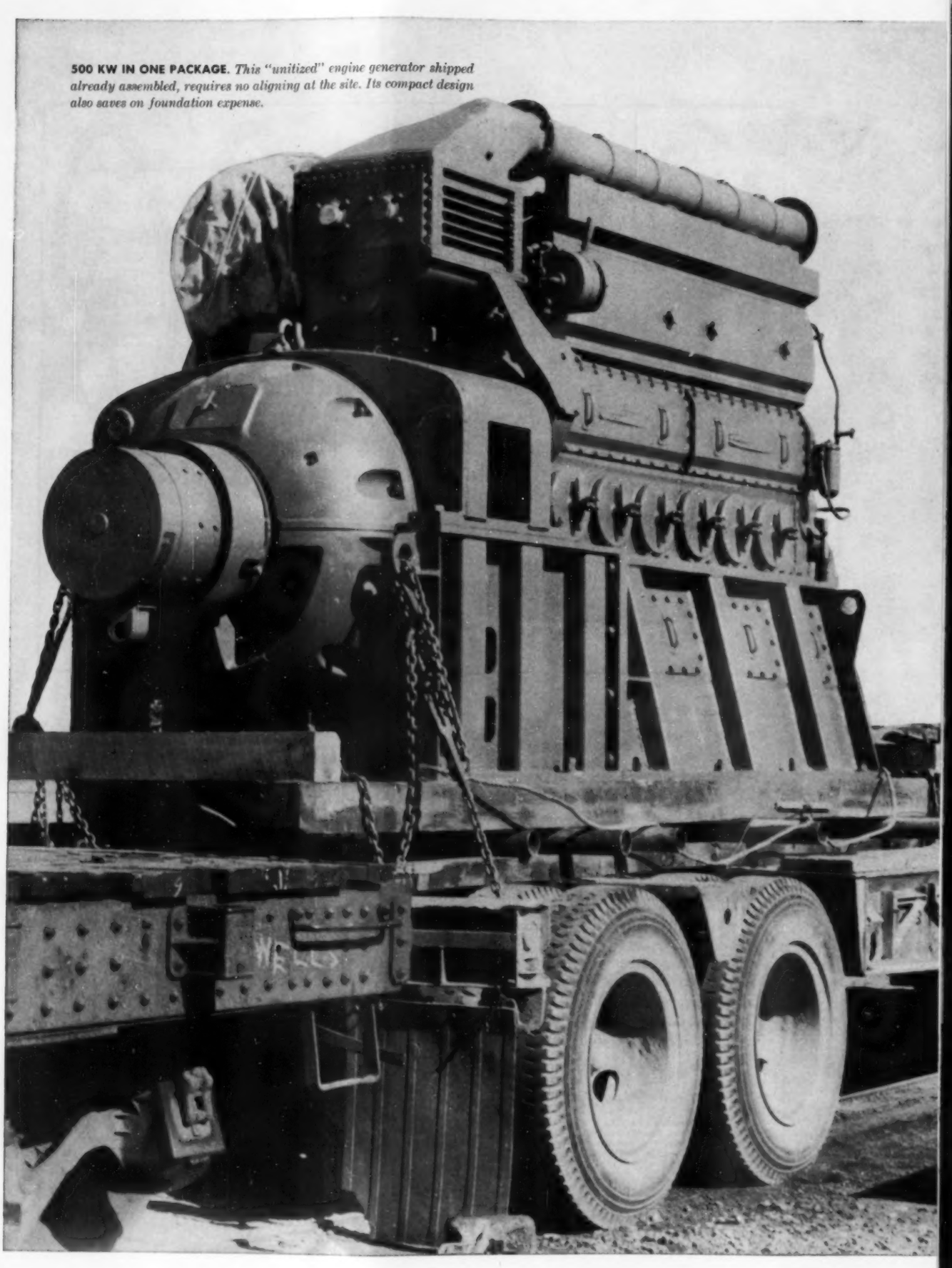


500 KW IN ONE PACKAGE. *This "unitized" engine generator shipped already assembled, requires no aligning at the site. Its compact design also saves on foundation expense.*

1957 POWER!

Long famed for reliability, Worthington 1957 power engines have many new features that can help you produce permanent or standby power at the lowest costs ever achieved for real *heavy-duty* units.

LOWER INSTALLATION COSTS—The new SW 9 engine you see at left has been "utilized" with its generator to drastically cut space requirements, installation time and expense. This design requires no aligning at the site. Should needs ever change, the entire unit can just as easily be picked up and moved to another location.

LOWER FUEL COSTS—In 1957, Worthington is pioneering jn power by designing and building engines *specifically* for turbo-charged operation. The SW 14, for example, is America's first high output diesel built only for high pressure turbo-charging.

For economy today *and* tomorrow, all '57 Worthington power engines can be furnished to run on the lowest cost, locally available fuels—residual, crude, and distillate oils; natural, sewage, propane or manufactured gas.

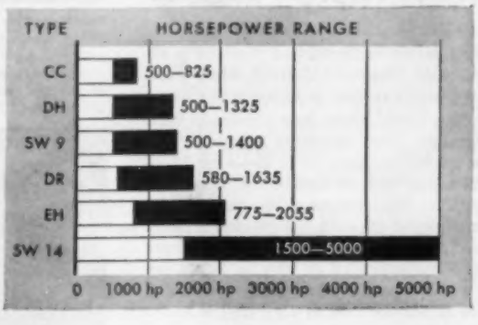
LOWER MAINTENANCE COSTS—With Worthington's 1957 engine line, you enjoy the economy of modern power design plus amazingly low maintenance. One of the many maintenance-saving features of the new SW 9, for example, is the Jet Swirl combustion chamber. The chamber is designed so that the air swirls as it enters the cylinder assuring rapid mixing of air and fuel for extremely clean combustion giving longer valve and liner life, as well as ultra-efficient operation.

The fact that every upper mechanical part is within reach from the operating level is another maintenance saving feature.

For reliable power in the 500 to 5,000 hp range, at the lowest possible cost, get in touch with your nearest Worthington District Office. Worthington Corporation, Harrison, N. J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont.

E.7.1

Choose your next diesel from Worthington's complete line of heavy-duty four-cycle power engines.



WORTHINGTON

Walter T. Messeck, Supt. of Utilities at Tipp City, Ohio, sets Enterprise "Select-O-Matic" control for Dual Fuel operation.

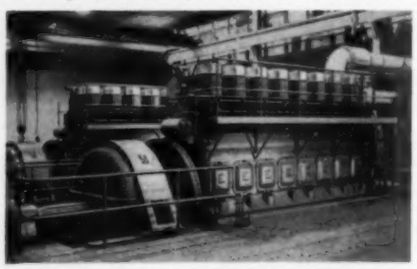
Dual Fuel? Heavy Fuel? Tipp City, Ohio, Profits From Both With Their Two Modern Enterprise Engines

As long as fuel prices fluctuate, and availability of different fuels varies, Enterprise "Select-O-Matic"® Dual Fuel engine systems contribute important savings in power production.

This is the case at Tipp City, Ohio, where they converted their Enterprise Engines from straight diesel operation just two years ago. Dual fuel operation on natural gas and No. 2 diesel pilot fuel is alternated on a seasonal basis, with straight diesel operation using either light or heavy fuel oils, depending on the current market price of the various grades of oil, during the winter months when gas is not available. Gas and heavy fuel operation is economical, and in this business the saving of as little as 1 mill per kilowatt hour amounts to a pretty penny when you're generating 9,488,200 KW hours a year as was the case at Tipp City in 1955.

Let us show you how Enterprise Dual Fuel economy can improve *your* operations. Write today for full information, or call your nearest Enterprise sales and service office.

The Tipp City Diesel Power Plant is a modern show place. Hundreds of visitors have inspected this efficient, well-run operation where two 1755 HP Enterprise Turbo-charged Engines supply all the power. Dual fuel and heavy fuel systems were installed in 1954, to take full advantage of the less expensive fuels available.



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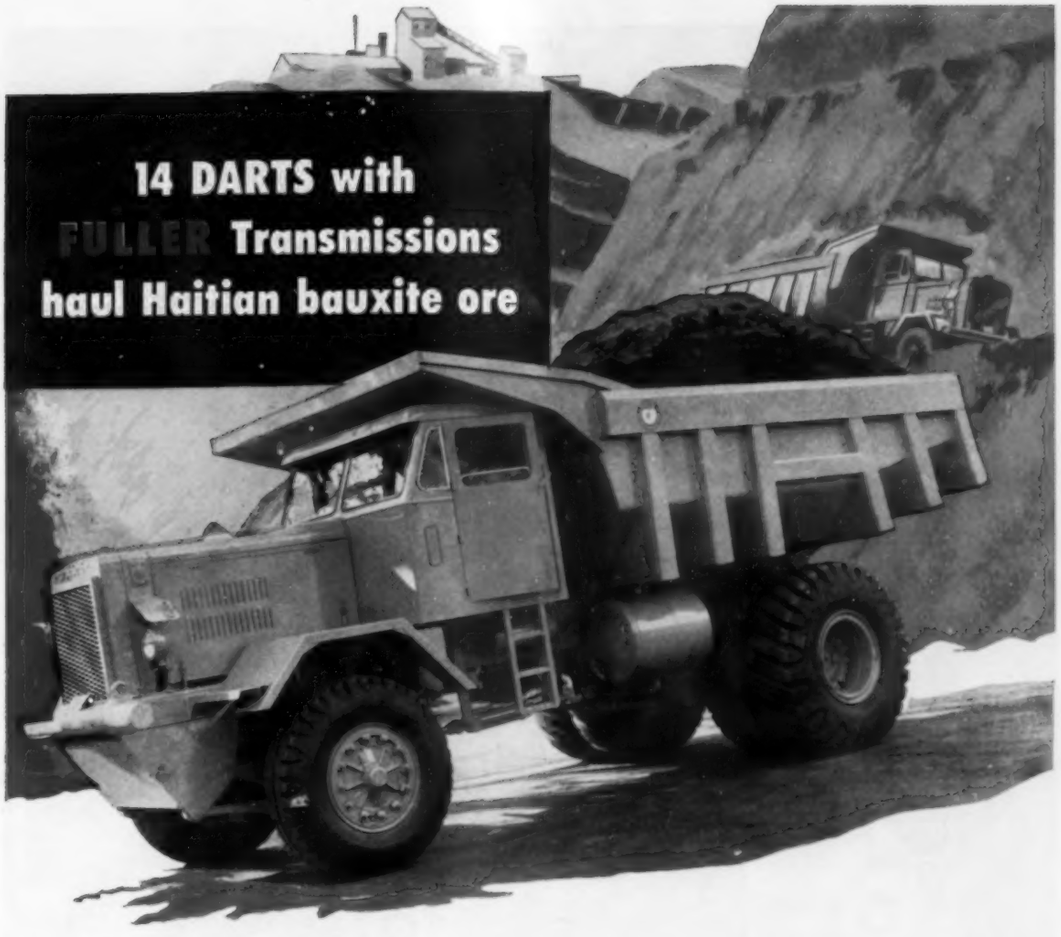


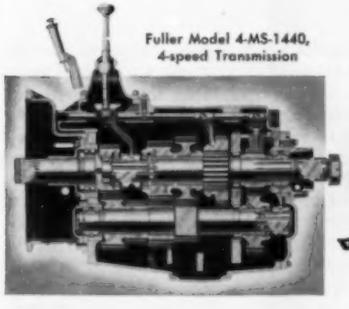
14 DARTS with FULLER Transmissions haul Haitian bauxite ore

Reynolds Haitian Mines, Inc., Miragoane, Haiti, depends upon 14 Dart 25-ton end dump trucks to carry bauxite ore from mines located on a plateau above Miragoane. Trucks are equipped with Twin Disc Torque Converters and 4-speed Fuller 4-MS-1440 Transmissions.

Downgrades vary from 0 to 11% . . . average 5% on the 8 and 11 mile hauls. The short, easy shifts provided by the Fuller Transmission, and the automatic braking feature of the torque converter, permit easy handling of the loaded (97,000 lbs.) trucks. Speeds are held downgrade to 25 mph *without* use of regular service brakes (a Reynolds' stipulation.)

There is a Fuller Transmission designed with *your* job in mind. More than 110 different models are available, for trucks from 100 to 400 hp, engines from 330 to 1440 cubic inches. Check with your truck manufacturer or dealer for the appropriate Fuller Transmission.

One of Reynolds' 14 new Model 25SL 25-ton Dart Trucks. Twin Disc Torque Converters are matched with Fuller 4-MS-1440 Transmissions.



Fuller Model 4-MS-1440, 4-speed Transmission

where horsepower really goes to work

FULLER MANUFACTURING COMPANY
Transmission Division, Kalamazoo, Michigan

Unit Drop Forge Division, Milwaukee 1, Wisconsin • Thuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.

Mining (Rock & Gravel) . . . Caterpillar D7 Tractor
Roadbuilding . . . Caterpillar DW21 and D8 Tractors
Grading . . . Adams "550" Grader
Construction . . . Caterpillar D8 Tractor
Excavating . . . Marion 111 Shovel
Arch Logging . . . Caterpillar D8 Tractor

they've all got this in common...

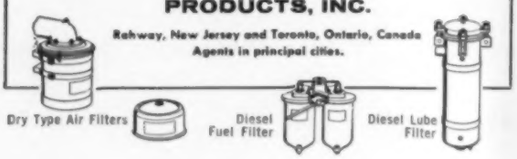
protection from dirt with Purolator filters

Filtration For Every Known Fluid

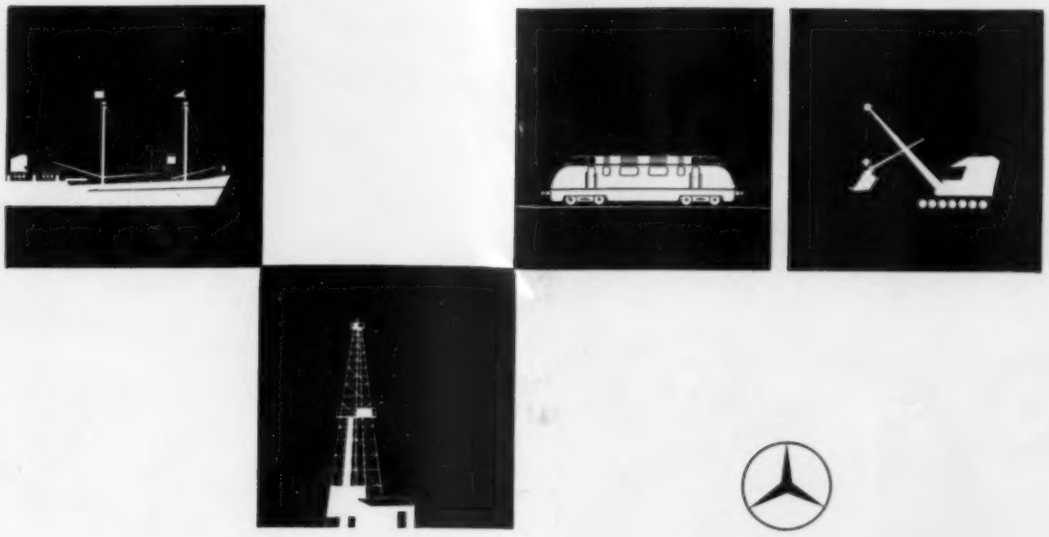
PUROLATOR

PRODUCTS, INC.

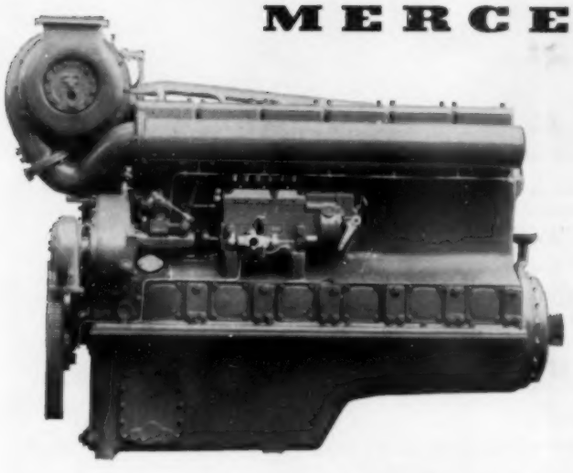
Rahway, New Jersey and Toronto, Ontario, Canada
Agents in principal cities.



When several manufacturers install the same line of filters on a wide variety of equipment, there must be a good reason. For all the equipment shown above the reason is simply this: Purolator filters remove more dirt. That's all there is to it. In terms of engine wear, performance, and long life, this can mean the difference between dependable operation and breakdown. That's why more and more manufacturers of equipment which must operate in dirt and dust insist on the extra percentage of protection given by Purolator filters. Purolator's complete line for construction equipment includes filters for air, fuel, lubrication oils, and hydraulic systems; plus a complete line of screens and strainers.



MERCEDES-BENZ



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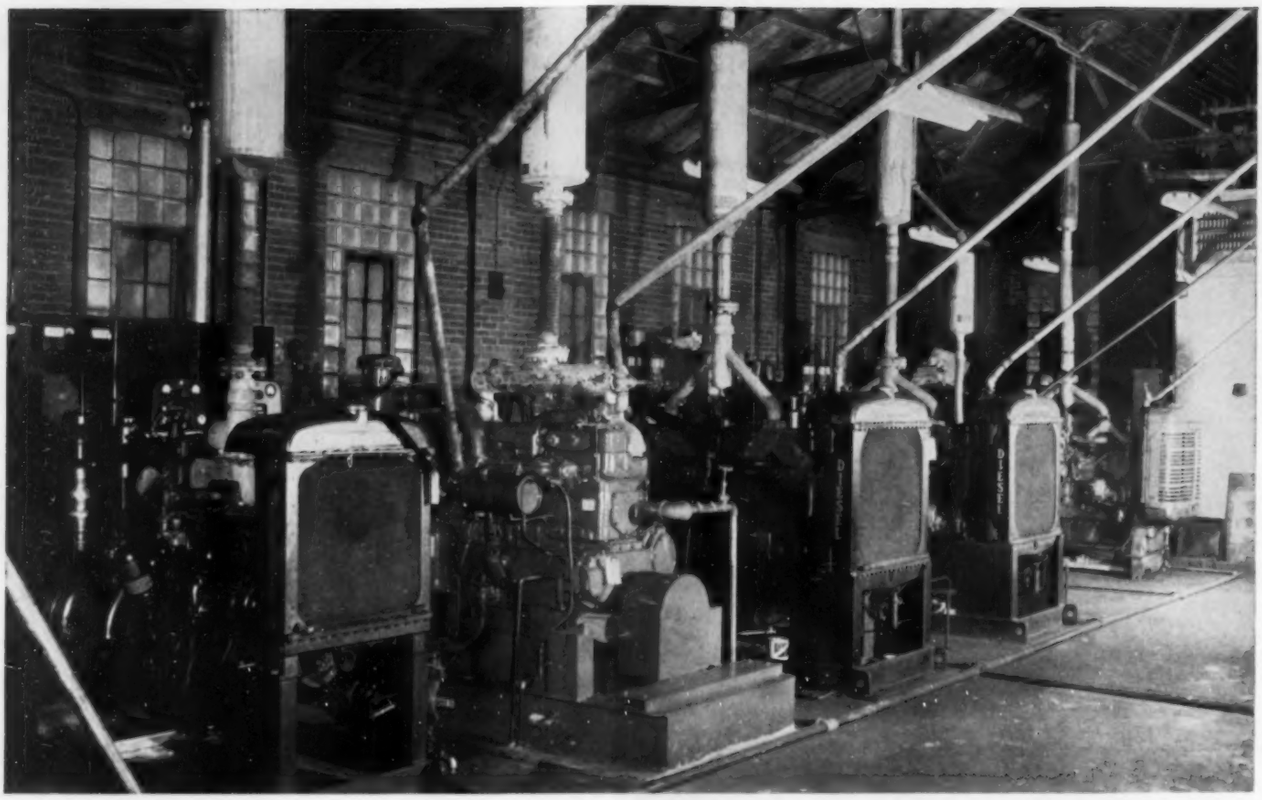

Here are five of eight International diesels that have driven Ready-Power generators in Standard Carbon's powerhouse for a total of 107 engine service-years. The UD-1091, second from left, is seven months old. The other 7 power units average over 15 years each of dependable service.

8 Ready-Power International driven GENERATORS CUT ELECTRIC COSTS 43%

Standard Carbon's International power units going strong after 107 service-years

The Standard Carbon Co., Steubenville, Ohio, is a nationally famous manufacturer of carbon brushes.

President W. F. Rogers fills in these details of their powerhouse operation: "We started in business in 1928 operating on purchased power. Back in 1939 we set up our own powerhouse—starting with an International PD-80 diesel power unit on a 48KW Ready-Power generator. Shortly thereafter we bought two more of these units. Today our eight Ready-Power generators are all driven by Internationals—*and we are generating power for 43% less than we pay for the 15% of the electricity we still purchase.*"

Supt. George Rogers adds: "Good service with only minor repairs sums up our experience with Internationals. Our Internationals have totalled 107 service-years—an average of over 13 years per engine. And only recently I rebuilt one of the 17-year-olds for the first time and still was able to reuse many of the original parts including the crankshaft!"

You, too, can get this same kind of completely dependable, low-cost power for your generator sets...or any driven machine in your pit or quarry. Simply call your easy-to-locate International Power Unit Distributor or Dealer. He can make power recommendations that are right for your needs. Equally important, his service facilities, his parts stock, his desire to be of service will help you get the most out of your engines. Call him soon.

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(l. to r.) Carl Olbertz, Milford plant superintendent, "Rollie" C. Bleimehl, Standard Oil industrial lubrication specialist and Frank Morgan, Milford chief engineer inspect crankcase. Rollie Bleimehl is qualified to give technical service on jobs like this. He's been doing this sort of work for 10 years. Rollie has a mechanical engineering degree from Iowa State College and has completed the Standard Oil Sales Engineering School.

23,000 hours on original rings and bearings—no overhaul

Milford, Iowa, Light Plant gets this performance from engine using STANODIESEL Oil M

"As is" photo of piston skirt and interior of crankcase. No wiping or cleaning was done before photographing or at any time during 23,232 hours engine has been in service. STANODIESEL Oil M is the lubricant.

When a new 720 H.P. Superior engine was put in service at Milford, Iowa in 1949, the plant management knew what oil they were going to use—STANODIESEL Oil M. Their choice was based on previous experience with Standard diesel oils in other engines.

After 23,232 hours of operation, the engine at Milford is still operating with the original bearings and rings. It has not been overhauled. The crankcase, as shown in the photo, is clean. Pistons are clean and bright with no sign of wear. Twice yearly, oil samples have been taken for laboratory analysis. Each time the analysis has shown the oil to be in perfect condition. Good maintenance and STANODIESEL Oil M have contributed to this performance.

Got a hard job for an oil? STANODIESEL Oil M can do it. STANODIESEL Oil M has superior stability. Its additive formula helps to (1) prevent oil viscosity build-up (2) keep crankcase, pistons, cylinder walls and other parts clean (3) control foam (4) maintain film on difficult to lubricate areas and parts.

There's a Standard Oil industrial lubrication specialist near you in any of the 15 Midwest or Rocky Mountain States. Call him for more information about STANODIESEL Oil M. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Quick facts about
STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult to lubricate areas and parts.
- Eliminates spark plug fouling in spark ignited engines and reduces combustion chamber ash deposits in engines burning natural gas, LPG and liquid fuels.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil commingle.

STANDARD OIL COMPANY
(Indiana)

STANDARD

SPECIFICATION STEEL ...
For the Unseen Heart of a Giant Diesel

Close control from engineering design to selecting raw materials, melting, forging, heat treating, finish and testing . . . the finished product, a 46,400 pound one piece, 12 throw crankshaft which proves its quality at the heart of the Diesel.

This 72 inch ingot, weighing 210,000 pounds, demonstrates the capabilities offered to you at Erie Forge & Steel Corporation. Here is the utmost in steel making skill . . . tough, rugged, innate quality necessary to stand the stresses to which the world's biggest one piece crankshaft will be subjected in operation . . . quality that assures the desired performance.

The Erie Forge & Steel Research and Development program is charged with the responsibility of making ingots so good that hot forging and heat treating operations produce a finished product which easily meets the requirements of the user. Your steel forgings and castings are produced here under One Responsibility and One Control. Place your requirements with us, fully confident of the desired results.

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Schwitzer utilizes the most modern production facilities for the Fabrication, Assembly and Testing of these Precision Products—for high or low volume production.

These services are available to you for product development applications in many diversified fields.

SCHWITZER
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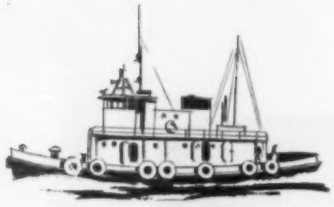
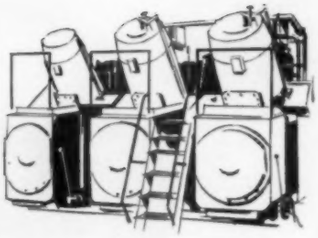
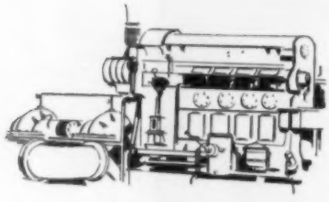


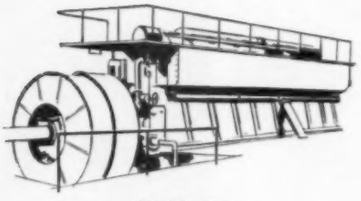
Marine



Engine compressor



Pumping



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Accurate check of exhaust temperatures with an Alnor Pyrometer system can assure minimum fuel consumption per horsepower and long service from the power you bought—without the interruption of many common-cause breakdowns.

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Series A Pyrometers are designed specifically for direct mounting on diesel engines or other equipment subject to vibration and rough usage. Readings are accurate to within + or −1%. Dustproof, fumeproof, splashproof. Switch capacities of 4, 6, 8, 10, 12 and 16 circuits. Other models to 31 circuits. Get full information—by return mail. Send for Bulletin 4361 with complete details of the Pyrometer and thermocouple assembly designed for your engine.

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DIESELS ASSIST OIL WELL FRACTURING

Diesels Meet The Challenge By Supplying More Powerful Engines to Help Rejuvenate the 527,000 Producing Oil Wells in These United States.

By JAMES JOSEPH

TO the lexicon of oil has been added still another new word: fracturing. And more specifically, sand fracturing. Behind the word and its significance lies a saga of dieselization: bigger, more powerful engines which, connected to high pressure pumps, have within the past six years stimulated to renewed production nearly one quarter of the nation's oil wells. In brief: a huge gallonage of fluid (often crude oil itself) is mixed with sand. This slurry, under high pressure, is injected into an ailing well. The mixture, at near-explosive force, fractures and craters the oil or gas formation. The sand both creates and widens the fracture and, coating the cavity's walls, holds it open. Created is a kind of subterranean sump where oil can gather . . . is thus immediately available for pumping. And the well, if it hews to averages, should at least double its pre-fracturing production—and perhaps, do far better.

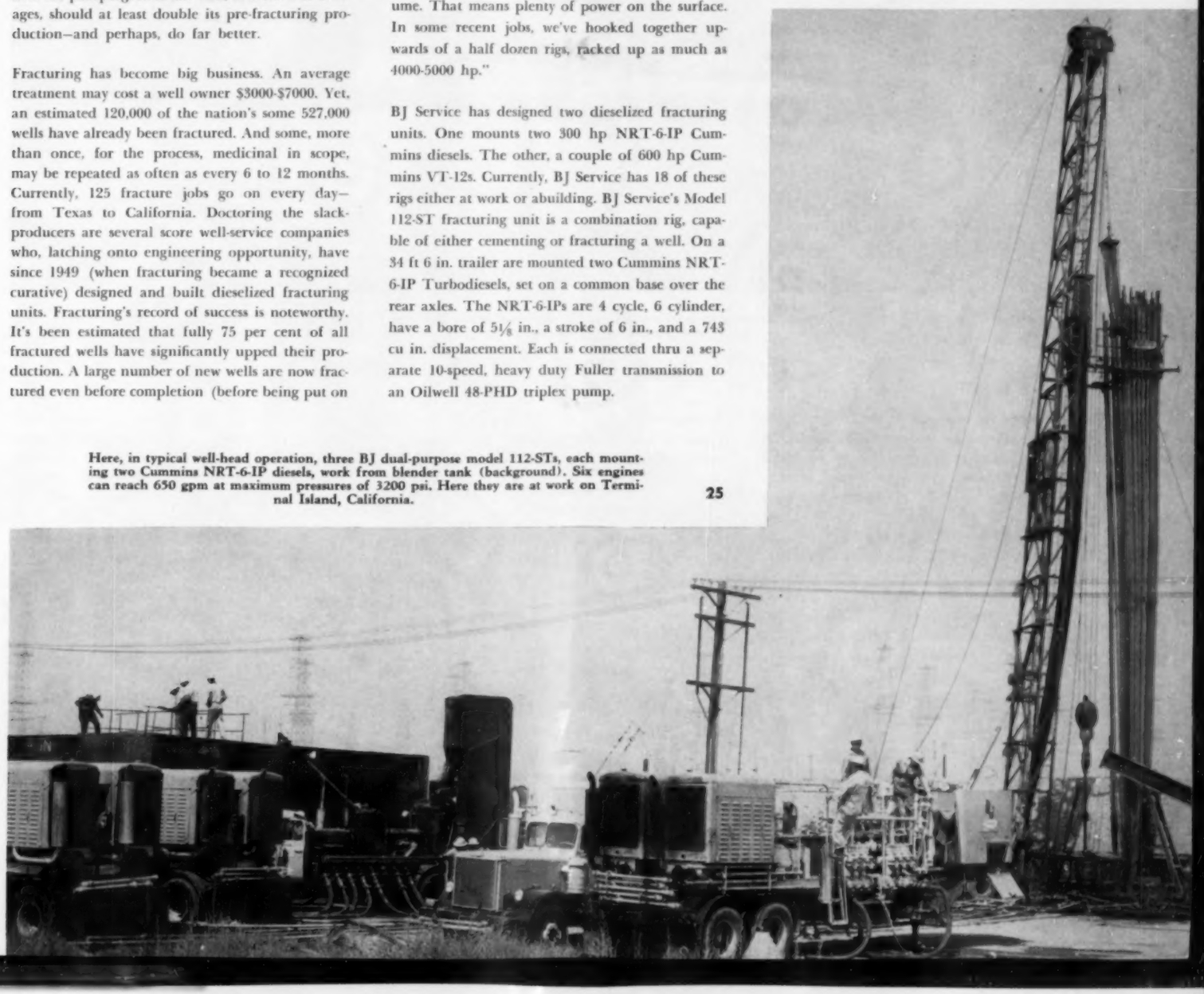
Fracturing has become big business. An average treatment may cost a well owner $3000-$7000. Yet, an estimated 120,000 of the nation's some 527,000 wells have already been fractured. And some, more than once, for the process, medicinal in scope, may be repeated as often as every 6 to 12 months. Currently, 125 fracture jobs go on every day—from Texas to California. Doctoring the slack-producers are several score well-service companies who, latching onto engineering opportunity, have since 1949 (when fracturing became a recognized curative) designed and built dieselized fracturing units. Fracturing's record of success is noteworthy. It's been estimated that fully 75 per cent of all fractured wells have significantly upped their production. A large number of new wells are now fractured even before completion (before being put on the pumps). And many marginal producers—old and new—have, through fracturing, been given new leases on productive life.

Fracturing and dieselization's part in it, is doubly significant now, with world oil supplies crippled thru Suez and the U. S. called to contribute to Europe's dwindling reserves. Specialized to this specialized job are dozens of mobile rigs—rigs which mount powerful diesel engines. For fracturing demands optimum power at the well head. Says Matt Riordan, vice president of BJ Service Inc., one of the service companies heavily engaged in fracturing, "fracturing units need to be both powerful and mobile. The need is for hydraulic hp, which is a function both of pressure and volume. That means plenty of power on the surface. In some recent jobs, we've hooked together upwards of a half dozen rigs, racked up as much as 4000-5000 hp."

BJ Service has designed two dieselized fracturing units. One mounts two 300 hp NRT-6-IP Cummins diesels. The other, a couple of 600 hp Cummins VT-12s. Currently, BJ Service has 18 of these rigs either at work or abuilding. BJ Service's Model 112-ST fracturing unit is a combination rig, capable of either cementing or fracturing a well. On a 34 ft 6 in. trailer are mounted two Cummins NRT-6-IP Turbodiesels, set on a common base over the rear axles. The NRT-6-IPs are 4 cycle, 6 cylinder, have a bore of 5⅛ in., a stroke of 6 in., and a 743 cu in. displacement. Each is connected thru a separate 10-speed, heavy duty Fuller transmission to an Oilwell 48-PHD triplex pump.

Pumps, like their engines, mount on a common base. A 200 cu ft two-compartment displacement tank (for cementing) is built over the trailer's fifth wheel pin. A manifold system permits pumping (1) from either displacement-tank compartments; (2) from both compartments; (3) from a portable blending tank, where sand and a carrying agent (crude oil, water, hydrocarbon base gels or emulsions) are mixed and agitated. The rig has a maximum working pressure of 8000 psi, a maximum discharge volume of 600 gpm at zero pressure. Mounted between the engines is a 130-gallon diesel fuel oil tank.

Model 112-ST (which weighs 49,000 lbs net) was among the first of its kind developed, a rig which



Here, in typical well-head operation, three BJ dual-purpose model 112-STs, each mounting two Cummins NRT-6-IP diesels, work from blender tank (background). Six engines can reach 650 gpm at maximum pressures of 3200 psi. Here they are at work on Terminal Island, California.

Newest fracturing rig is BJ's model 113-ST which carries two Cummins VT-12-1, 600 hp, 12-cylinder Turbodiesels, plus dual pumps and manifolding.

could, if necessary, both cement and fracture. Now, however, fracturing has boomed to popularity. So much so, in fact, that BJ Service has designed, and is building, six mammoth single-purpose fracturing rigs. Tabbed as Model 113-ST, the first went into field use in September, 1956. Model 113-ST carries two Cummins VT-12-I, 600 hp, 12-cylinder Turbodiesels. The VT-12s are 4 cycle, with a bore of 5⅛ in., a stroke of 6 in., a 1486 cu in. displacement, and are rated 600 hp at 2100 rpm. BJ Service says they deliver full hydraulic horsepower up to 6500 psi, have a maximum injection rate of 28 barrels per minute at pressures up to 1000 psi.

Engines work thru parallel though identical transmission and pump systems. Each engine is coupled to a Cotta transmission which in turn chain-drives a Gardner-Denver 4½ in. x 8 in. triplex pump (rated at 10,000 psi). Pumps are designed for high-speed operation at high volumetric efficiency. The Gardner-Denvers deliver thru 3 in. high pressure fluid lines (rated 10,000 psi), assuring maximum horsepower at the well head. Engine cooling efficiency is assured thru twin 27.5 gallon radiators and variable-pitch (Aerovent Fan Co.) airfoil-design fans.

Anywhere from one to a half dozen of these fracturing mammoths may be drawn up near a well head. Nearby stands a blender tank, its capacity about 1400 gpm. The tank, rigged with agitators, may hold lease crude (oil from the well site) or any of a number of carrying agents. Tho lease crude, because it's readily available, is often the least expensive of agents, any of six other general types are commonly used: (1) hydrocarbon base gels or emulsions; (2) combination hydrocarbon and acid base gels or emulsions; (3) refined oils; (4) acid gels or emulsions; (5) water base gels; and (6) water to round out the group.

Sand is introduced into the blender tank, and the slurry is mixed. The slurry's viscosity varies, depending on a number of factors, including depth of the well, available pressure, type of oil-bearing stratas and projected duration of the treatment. Often three dual-dieselized fracturing units, all mobile, work from the same blending unit and over the same well. Common are fracturing horsepowers in the 2000-3600 hp range, though not uncommon are 4000-5000 hp. Says BJ's Matt Riordan, "fracturing presupposes the availability of high horsepower. Partly, too, this horsepower speeds the job—allows fracturing rigs to complete a treatment, uncouple, and move quickly to another job."

Not always is the fracturing initiated purely by diesels. Sometimes, depending on the hardness, compactness and other structural factors, initial fracturization may be started or boosted by a kind of jet-propelled missile. BJ calls its tool Frac-Assist—a booster device comparable to an aircraft taking off with aid of rockets. The diesel driven fracturing treatment, for that matter, is usually in progress as the Frac-Assist missile is lowered into the

well. Triggered by a kind of detonator, the Frac-Assist, fueled by solid propellant (the same type used in many missiles), creates for a few seconds a tremendous pressure. A high-powered gas builds up inside the Frac-Assist chamber. When it exceeds the pressure in the tubing, it pushes through the blowout plug and exerts a tremendous, nearly instantaneous downward surge behind the fracturing fluid already in the tubing. "This," say BJ engineers, "produces a super fracturing force, to create multiple and highly-productive fractures—fractures which are maintained and extended by the normal, uninterrupted pumping flow which immediately follows the Frac-Assist striking force."

Like a huge, single-stroke pump, the Frac-Assist tool generates some 5000 hydraulic horsepower, boosting the treatment's speed and efficiency. Treatment time and slurry viscosity depends on engineering analysis. But whether average—thus about 7500 gallons of carrying agent and 15,000-lbs of sand—or not, the treatment usually requires only 15-40 minutes. Mobile diesels have capsuled the set-up-tear-down routine to about 3½ hours; two hours to rig up, 15-40 minutes for the injection, an hour or so to tear-down. Injection pressures and volume have tremendously increased—thanks to bigger diesels and bigger pumps—since 1949. Where some early injection rates were 1 to 5 bbl/minute (and pressures relatively low), today as many as 60 bbl/minute may be injected with upwards of 5000 hp behind them.

Diesels have both made fracturing possible, and have shortened treatment time. And greater pressures, trending toward higher hydraulic horsepower (what the well owner's really interested in), displace the sand right into the already-fractured formation. Thus, when the treatment ceases, the fractures remain open, oil flows into this man-made sump, and the well may double or even quadruple its former production. Consider a Southern Oklahoma well, four times fracture-treated since June, 1950. With the first treatment (750 gals. of Hydrafac gel, 300-lbs of sand), production increased from 30 to 58 bbl a day. The total productive increase credited to this rather limited treatment was 15,400 bbls. A second treatment was performed in 1951 (2400 gals. of carrying agent, 1200-lbs of sand). Production rose from 28 to 53 bbl a day. The production bonus credited to this treatment: 12,100 bbl. A third treatment (6670 gals. of carrying agent, 5000-lbs of sand) was done in 1953, increasing production from 20 to 59 bbl a day, for a total bonus of 17,100 bbl. Fourth, and last treatment, was completed in 1954 (10,000-gals. of carrying agent, 10,000-lbs of sand). Production jumped from 5 to 13 bbl a day; and fracturing was credited with a bonus 5200 bbl.

In brief: though operating in a depleting field, this well's productive life was extended, the well kept profitable at least several years longer through fracturing. Here was more than just a case of stimulating an old producer. Treatment enabled the well to pump what little oil remained in the stratas, thus wrung maximum output from the field and economic longevity from the well. Fracturing can't create oil where none exists. But, backed by dieselization, it can fracture stratas, increase the petroleum flow, turn a sick well profitably healthy, as long as there's oil underground.

BJ's dual-Purpose cementing and fracturing unit which mounts two Cummins NRT-6-IP Turbodiesels. As many as three of these units may be manned over a well if stratas are very hard.

AIR COOLED 750 HP DIESEL

Excerpts And Comments By Arnold B. Newell On A Very Interesting Paper Given By Dr. H. H. Haas And E. R. Klinge Of The Continental Aviation And Engineering Corp., At The S. A. E. Annual Meeting In Detroit On January 17th.

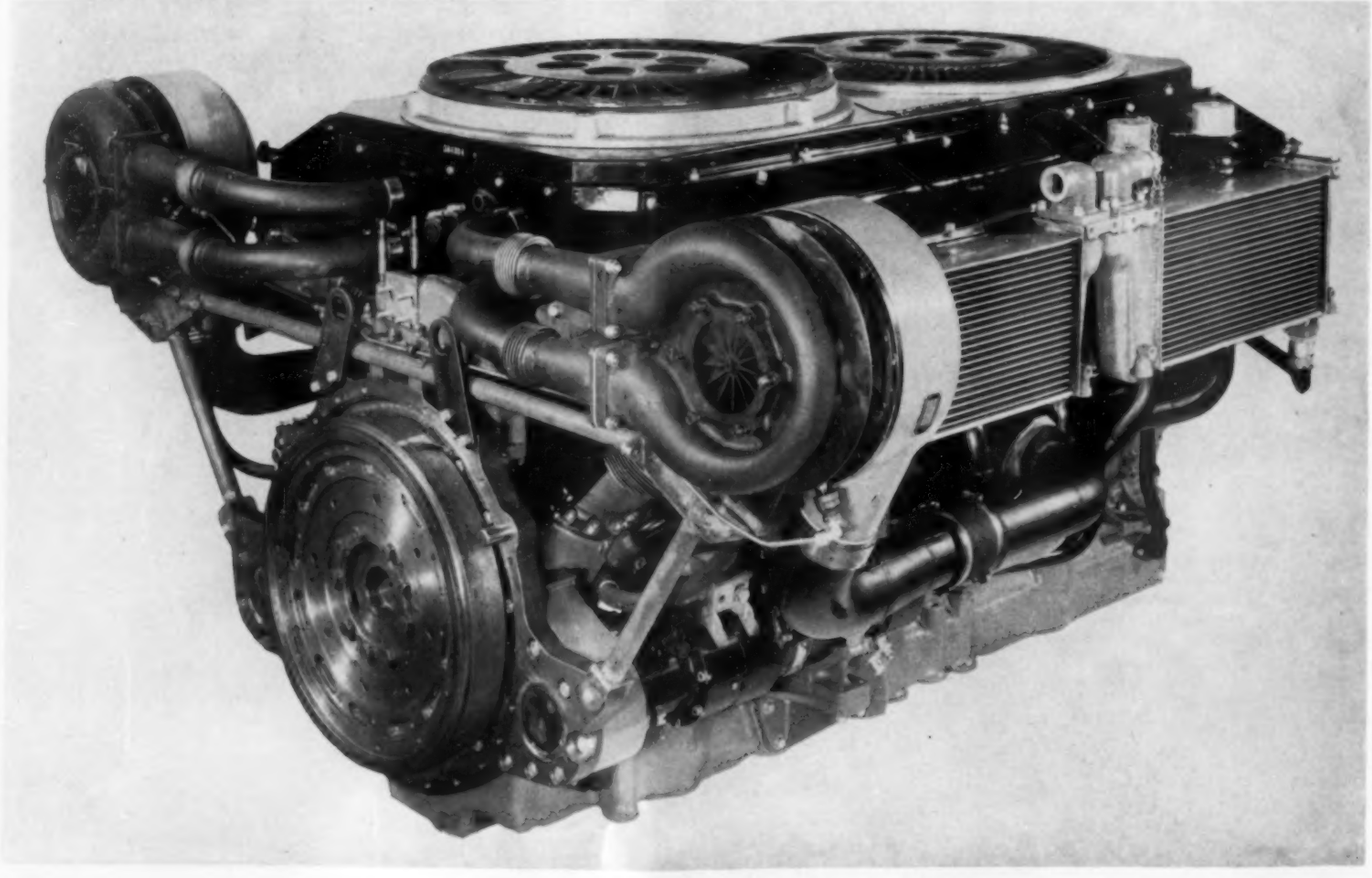
ONE of the most interesting contemporary developments in the diesel industry is the Continental 750 bhp air cooled diesel which was the subject of an interesting and comprehensive paper presented before the SAE Annual Meeting in Detroit in January by Dr. Herbert H. Haas, Chief Engineer and Earl Klinge, Assistant Chief Engineer of Continental Aviation & Engineering Corporation of Detroit. Reference to that paper reveals that the primary purpose of this development was to reduce fuel consumption of gasoline engine powered combat vehicles by approximately forty per cent. The engine is characterized by low fuel consumption, light weight and compactness. The bore and stroke are 5¼ by 5¾ in., displacement 1790 cu in. Design characteristics are 4-cycle, 90° V-type, 12-cylinder, air cooled, exhaust turbocharged with a rating of 750 hp at 2400 rpm and potential output increase to 850 bhp. Engine oil coolers, transmission oil coolers and cooling fans are mounted on the engine.

The bare engine weight is 3800 lb equivalent to 5 lb per hp. Fully equipped as a unit package the weight is 4200 lb. The bmep is 147 psi at 1600 rpm peak torque and 139 psi at 2400 rpm rated power. The peak torque is 1740 lb-ft at 1600 rpm. Either one of two starting methods may be employed. One is hydraulic starting and the other is an 18 hp electric starter using 24 volts supplied to the battery by a 300 amp 24 volt generator. The induction air flow is 2000 cfm and the cooling air flow is 22,000 cfm. Other data of interest presented by the authors reveals 10 gross hp per cu ft of installed unit cooled power package; less heat rejection than a gasoline motor and therefore reduced cooling power. The turbocharged diesel requires no exhaust muffler and has no loss from this source. It is not primarily affected by air cleaner losses as the turbocharger merely operates at a slightly higher pressure ratio. Direct comparisons on this order can be made with extreme accuracy as the AVDS-1790 air cooled diesel's predecessor is the AV-1790 gasoline motor which in its various models is currently standard on combat vehicles.

In basic configuration the diesel follows its gasoline-burning predecessor with overhead camshafts, cooling fans located on top of the engine, engine oil and transmission oil coolers mounted on the engine and cooled by the fans, and direct attachment to the transmission. Higher compression, fuel injection and other basic characteristics of the diesel required a new design concept. Structural features are given by the authors. There is a simple aluminum crankcase of Alcoa 355 Aluminum with the various sections shaped to minimize stress concentrations and deformation under load. Instead of a few stiff bolts many highly flexible bolts are used to assure good stress distribution.

For uniform load distribution in the bearing area there is heavy diaphragm support structure with four cap bolts and two through bolts for each

The Schwitzer turbochargers and neat arrangement of ducts with expansion joints clearly revealed. Cooling air is ducted upward by the specially designed horizontal cooling fans. Oil coolers are large because a substantial amount of waste heat is carried off through the medium of the lubricant and piston cooling oil.



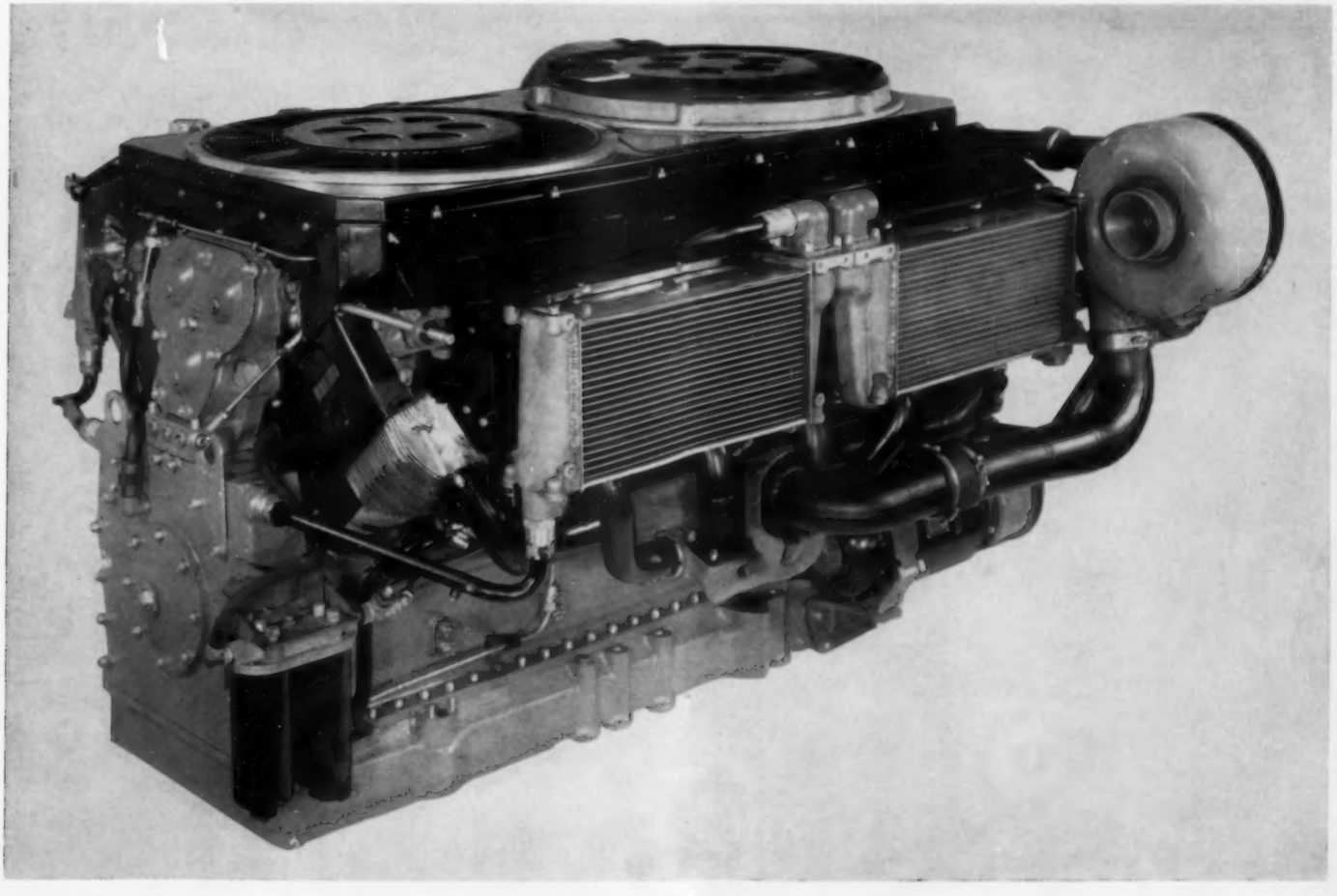
bearing, clamping the bearing cap in the tunnel slot, thus forming an integral part of and tieing the crankcase walls together. The crankcase extends far below the crankshaft center line and the cast aluminum oil pan is made a part of the structure, thus forming a stiff beam member compensating for the small crankcase height. To meet the need of torsional and bending rigidity of the crankshaft the main journal dimension is 4¼ in., and the crankpins are 3¾ in.; cheek width is 1.6 in., counterweights are integrally forged providing approximately 85 per cent balance. Main and con-rod bearings are rather heavy copper-lead backed with fairly heavy shells 0.250 in. thick in the case of the mains. Mains are 2 in. wide and con-rod bearings are 1.35 in. wide. The connecting rod design is conventional. The material is forged steel fully shot-peened. Because of the high load encountered, particularily in the piston boss area the pistons are aluminum forgings of Alcoa 32ST-6. Piston ring selection was not difficult. There are four chrome plated rings. A 15° angle keystone top ring is used, along with two taper faced compression rings and dual edge conformable scraper ring. Basic thickness is 0.90 in.

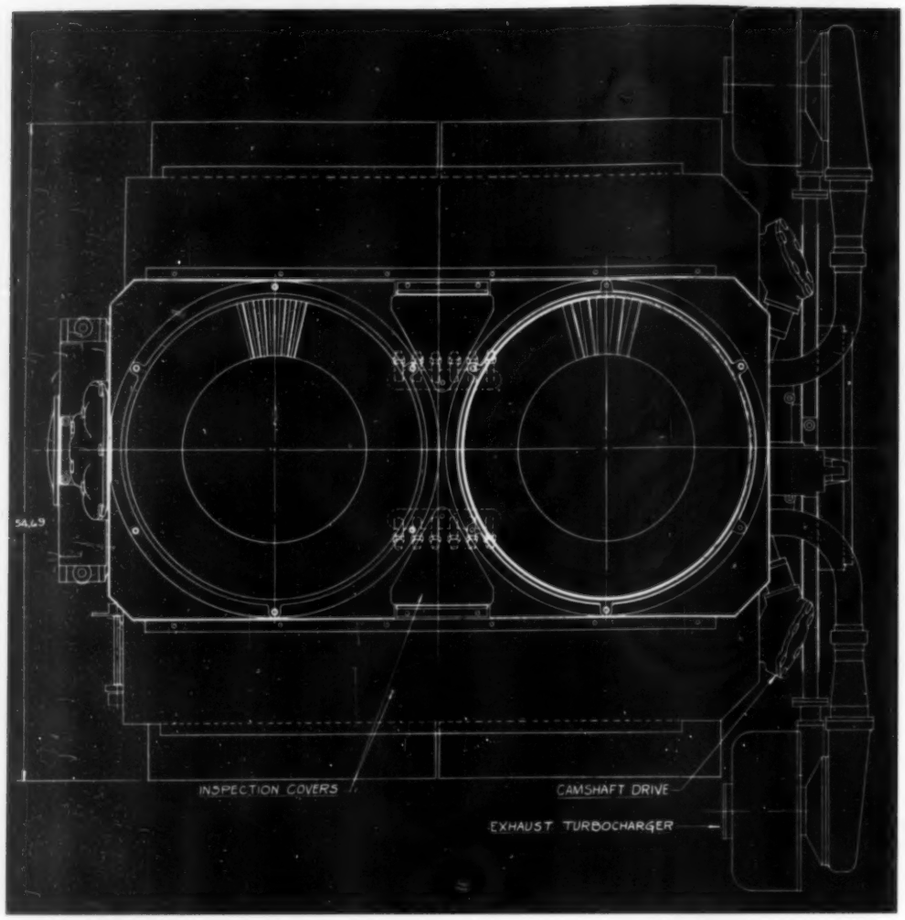
The cylinder unit includes a cylinder head of Alcoa 142-T75 Cu Ni alloy with overhead camshaft, two angle valves, simple cooling fin design and injection nozzle installation for maximum accessibility. Piston design is a compromise between large radius dome for minimum stress and sharp cornered dome for greater piston length and reduced crown exposed to heat. Cooling fins on the cylinder head are set at a 30° angle and reach from intake to exhaust sides of the head giving ample fin area for a maximum head temperature of 350° F at 750 hp output. Steel cylinder barrels are shrunk into the heads while hot. Valve seats and guides are shrunk in place at the same time. Due to low exhaust temperature of the diesel cycle common silicon-chrome steel valve seats are used. Steelite facing of the inlet valve seats prevents wear. Exhaust valves do not show any sign of difficulty. On the lower end of the injection nozzle assembly, cooling fins are provided over which air is bled from the turbocharger through a hole drilled from inlet port. Additional cooling of the nozzle holder is achieved through oil sealed in the rocker box of the engine.

The lube oil system consists of two circuits, one for main lubrication and one for piston cooling operating independently and fed by one multiple oil pump. The main pressure pump draws oil from a compartment in the oil pan fed by a twin scavenge pump drawing oil from both ends of the oil pan. The oil is forced at 50 gpm through engine oil coolers, then through full flow filter and thence through engine oil galleries to the bearings. An oil pressure regulator is influenced by pressure on mains and dumps surplus oil back into the pan. A small partial flow of oil is taken from the main filter and passed through a second full flow filter to the turbocharger and the fuel injection pumps. Piston cooling pump delivers 20 gpm to the jets at the bottom of each cylinder providing continuous oil spray to the inside of the piston. A thermostat controlled by by-pass opens at a temperature below 140° F. and dumps the oil flow directly back into the sump thus preventing unnecessary power loss at other than high load conditions.

The oil pan is divided into a reserve compartment and two open end compartments in which oil flowing back from the engine is picked up by the scavenge pumps and fed to the pressure pump compartment, which when filled overflows to the reserve compartment where it is stored. The capacity of the reserve compartment is 10 gallons and the pressure pump compartment is seven gallons which is the minimum oil capacity at which the engine can be operated safely. Lube oil filters are independent units in filter housings mounted in the V at the damper end. A wire mesh of 80 micro millimeters and a paper fine filter of 20 micro millimeters are arranged in series, the former feeding the galleries and the latter the turbocharger and the fuel injection pumps. Both filters are supplemented by by-pass valves for appropriate pressure level. If paper filter elements are not available the turbocharger and fuel injection pumps are still protected by the wire mesh elements.

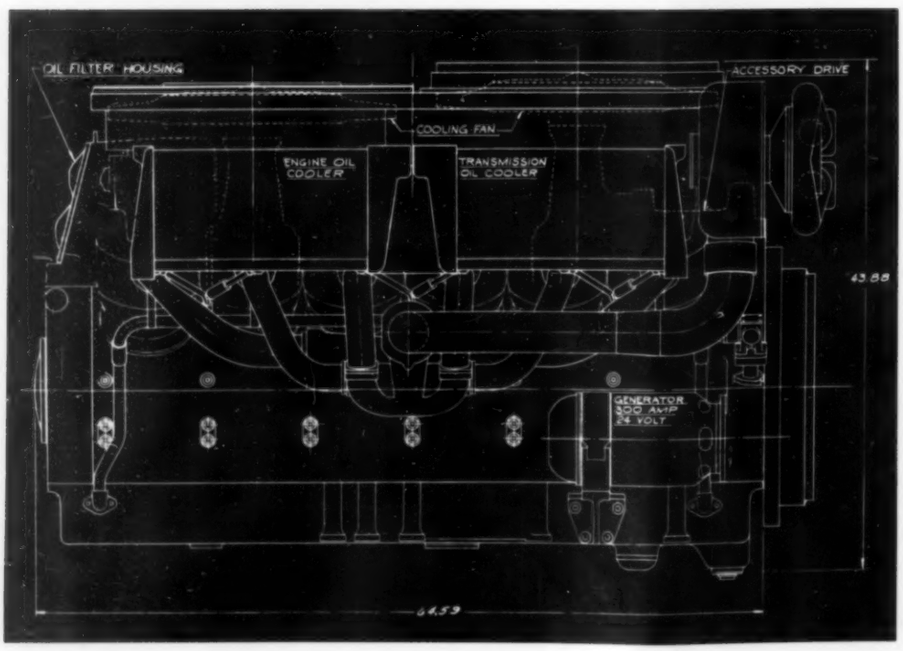
The right-hand side of the Continental air-cooled diesel shows the arrangement of oil coolers, the Schwitzer turbocharger and the cooling fans. Note the cooling fins on one of the cylinders ahead of the oil cooler.





Plan view of this 750 hp air-cooled diesel.

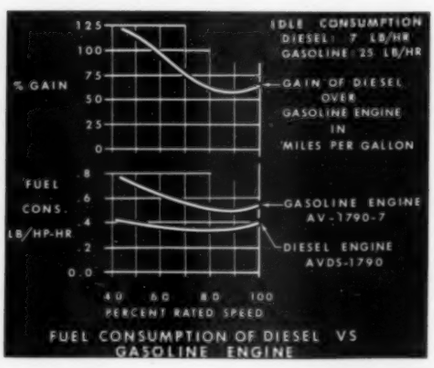
Side view of the Continental air-cooled diesel.



There are two fuel injection pumps located in the V between the fan towers in an accessible, compact arrangement. These are conventional 6-cylinder American Bosch APE 6BB pumps with 12 millimeter plungers with suitable injection characteristics for 600 to 2600 engine rpm. Their location permits use of uniform length, short injection lines. Special nozzle holders have been developed, but standard American Bosch ADB type nozzles are used. They have eight 3-millimeter holes. A positive displacement type fuel delivery pump mounted on top of the generator gear drive delivers fuel to injection pumps at 25 psi at a rate of 200 gph. There is an automatic timing unit located ahead of the two fuel injection pumps.

Dual Schwitzer turbochargers were used because of space and package limitations in military vehicles. They are located outboard of the engine at flywheel end with simple duct connections, and they are air cooled. Specially developed for this purpose with low rotating inertia, they have good component efficiency, light weight and simple low-cost design. The exhaust manifold system is in four groups of three cylinders each leading to corresponding nozzle divisions in the turbines to improve the scavenging process and prevent interference between cylinders. A spider type intake manifold has individual manifolds of about the same length leading from a junction box to each cylinder for even distribution and maximum utilization of combustion air.

The magnitude of the new design features necessitated a development policy of separating many problems from the whole to obtain certain critical experiences. This broke down into three groups: (1) anticipating and separating troubles having little or no previous experience background (2) isolating problems from the whole by running components independently of and prior to testing the whole engine and, (3) concentrate the multi-cylinder engine development upon problems which are peculiar to and cannot be separated from the whole. Two single cylinder engines, a V-twin test engine and numerous bench test setups and a vast amount of instrumentation were used. In the paper as presented by Dr. Haas and Dr. Klinge a vast amount of technical data regarding the preliminaries will give designers a close insight into the preparatory achievements. They also reported that the first V-12 engine produced its rated performance within a week after its green run and performance expectations were met or exceeded.



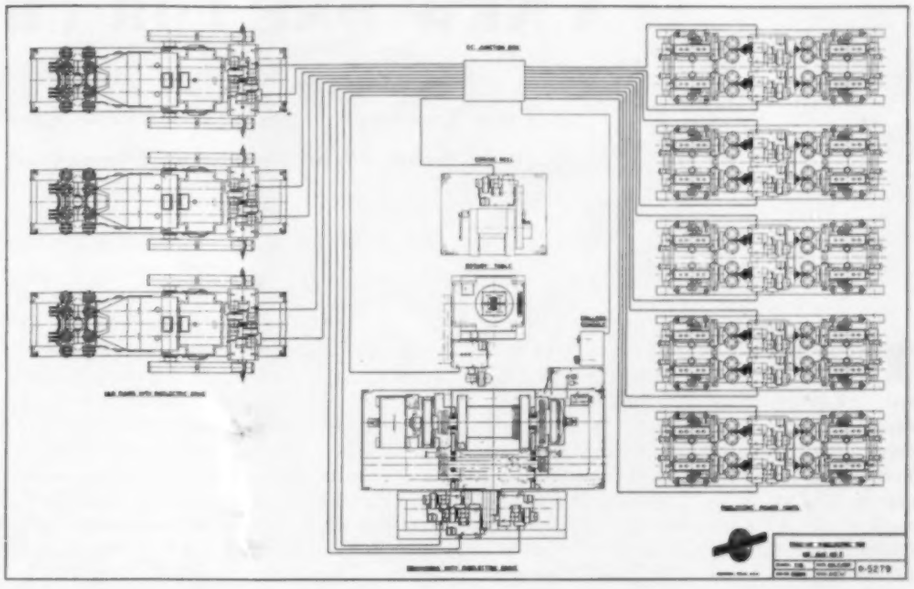
FUEL CONSUMPTION OF DIESEL VS GASOLINE ENGINE

LARGEST RIGELECTRIC

ONE of the most powerful diesel electric power plants ever assembled to provide power for an off-shore drilling rig (6,000 maximum hp) has been assembled in Houston by Stewart & Stevenson Services, Inc. for placement on a giant mobile platform designed for ultra deep water operations. In terms of horsepower or kilowatt output, the Rigelectric power packages which will supply power for the entire drilling operation are sufficient to satisfy the normal domestic requirements of an average city of over 30,000 people. The Stewart & Stevenson Rigelectric units are being installed on the *MR. GUS II*, a mobile platform being built in Beaumont, Texas by the Bethlehem Shipyard for the C. G. Glasscock Drilling Company of Corpus Christi, Texas.

This new mobile platform the *MR. GUS II* and its modern, powerful Rigelectric power plant will eclipse the first C. G. Glasscock mobile platform which has been operating for almost two years and has set quite a record in deep water offshore drilling. At this particular moment, the original *MR. GUS I* has finished drilling its ninth well in approximately 87 ft of water and almost 70 miles offshore. The new greater *MR. GUS II* will be capable of probing for oil and gas in approximately 140 ft of water in the gulf.

To accomplish this feat, the management of C. G. Glasscock Drilling Company called again on dependable diesel equipment and the know how of Stewart & Stevenson Services. The result is a power plant that shades that of the original *MR. GUS* by almost 2000 hp and yet is extremely compact and conserves considerable space over the original power plan of the *MR. GUS*. Power output on *MR. GUS II* is 6000 hp maximum for the drilling equipment with additional power for auxiliaries exceeding 1500 hp. The primary power for *MR. GUS II* will consist of five Stewart & Stevenson Model S24-1000 Rigelectric power packages each



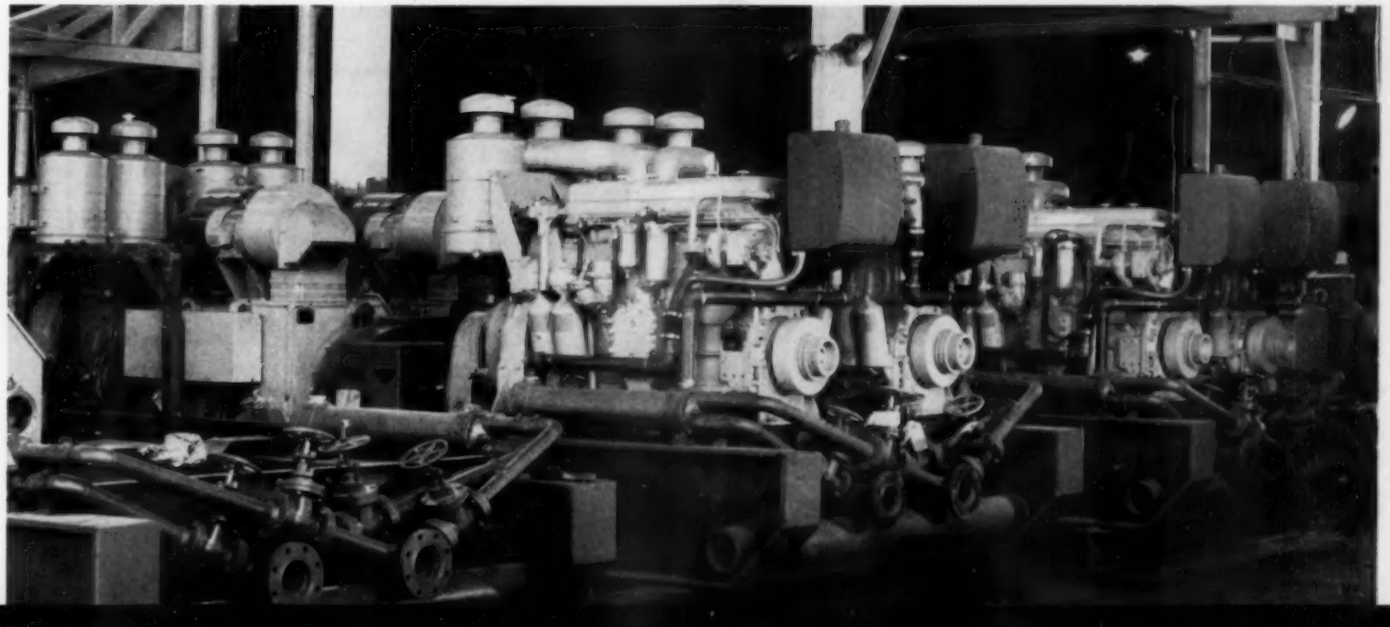
Installation diagram of the five Stewart and Stevenson Rigelectric units on the drilling platform, *Mr. Gus II*. These units provide all power for the entire drilling operation.

of which is composed of two 600 hp dc generators and four Model 6-110 GM Detroit diesel engines. The arrangement is such that on each of the five model S24-1000 Rigelectric power packages, all four of the model 6-110 engines may supply power to both generators simultaneously or if desired, all four or any part of the four engines can be called upon to supply the full power through either of the two generators.

The mammoth drilling equipment on the *MR. GUS II* which the Rigelectric units are powering, consists principally of a National 160 drawworks which is driven by three Rigelectric dc electric motors with a combined capacity for hoisting service of 2700 hp. The mud pumps consist of three National G-1000 pumps each of which is powered by dual Rigelectric dc electric motor drives with a combined capacity for continuous duty service of 1200 hp. The independent rotary table is also driven with an individual dc electric motor as well as the coring reel. Alternating Current electric power for auxiliary service and lighting is furnished by three Stewart & Stevenson Model 110-GD300, 300 kilowatt ac diesel generator sets powered by General Motors Detroit diesel engines. Control equipment for the diesel electric sets is Stewart & Stevenson's own control system which provides positive and flexible control with maximum simplicity.

The new *MR. GUS II* is a three-deck platform which will dwarf anything now in use with respect to off-shore operations according to information obtained from Glasscock engineers. The engines which provide power for this original *MR. GUS I* and which are largely responsible for the successful drilling record are all General Motors Detroit diesel engines applied and furnished by Stewart & Stevenson Services, and they have already operated more than 12,000 actual operating hours with no major repairs.

A lineup of the model S24-1000 Rigelectric units, each equipped with four Detroit Diesel model 6-110 engines as prime power sources, ready for shipment at the Stewart and Stevenson Houston plant.



A NEW ONE FOR CHOTIN

Two Turbocharged Two Cycle Cleveland Diesels Give This Towboat Plenty of Power.

By DOUGLAS SHEARING

THE new towboat *M/V Cypress*, owned and operated by the Chotin Transportation Inc., was christened recently by Miss Linda Chotin, daughter of Capt. and Mrs. Scott Chotin, at New Orleans, La. The towboat was designed by Chas. Koellein, Jr., Vice President and operating manager of the J & S Shipbuilding Corp., Slidell, La., and was built at the J & S Shipbuilding Corp. The *Cypress* is the ninth towboat to be added to the Chotin fleet. She is one of the largest river towboats to be built in the Gulf Coast area and reportedly has the most horsepower for its size of any towboat operating on the inland waterways. The *Cypress* is 140 ft long, 30 ft wide and is powered with two, 12-cylinder Model 498 General Motors Cleveland turbocharged diesel engines with a combined rating of 4200 hp.

The *Cypress* is named after the first towboat operated by Capt. Jos. Chotin, President of the Chotin Transportation Inc., in 1903. This first towboat was a sidewheeler and towed cypress rafts from the cypress swamp land to the sawmills at Morgan City and Patterson, La. According to Capt. Scott Chotin, Secretary and Treasurer of the Chotin Transportation, Inc., the *Cypress* will tow oil barges on the Mississippi and Ohio Rivers. Capt. Scott Chotin said, "We expect to increase not only the speed of the tow but also the tonnage with the new *Cypress*, because of the higher horsepower. This will only be accomplished when additional terminal facilities are provided."

Main propulsion is provided by two new General Motors Model 12-498 turbocharged diesel engines, each rated 2100 bhp at 850 rpm. The engines are direct connected to Falk 21 MB reversing-reduction gear drives with marine airflex clutches. The gear ratio is 2.788:1 providing 305 rpm shaft speed for two 86 in. diameter, 4-blade stainless steel propellers. The auxiliary power for the *Cypress* is furnished by two 60 kw, three phase, 60-cycle, 220 volt ac Delco generators driven by General Motors Model 6-71 diesel engines.

This is the first towboat to be powered with the new Cleveland turbocharged 498 series diesels, and the high horsepower output in a compact vessel illustrates the excellent power to weight ratio features of these engines. This new engine series was described fully in the September, 1955 issue of DIESEL PROGRESS, but this important installation merits a recap of some of the important features of the engines, particularly in regard to the turbocharging and its advantages. The engines in the *Cypress* are of the V type and have an 8¾ in. bore and 10½ in. stroke. They develop 175 hp per cylinder. As can be seen in the illustration of the engineroom, the DeLaval turbocharger is installed at the front of the engine receiving engine exhaust gases from a large manifold in the vee. A Harrison intercooler is installed to cool engine intake air, and an engine driven positive displacement blower is arranged in series with the turbocharger. This blower is used to supplement the turbocharger in providing adequate air to the engine when it is idling and also to provide for good engine acceleration characteristics for maneuvering.

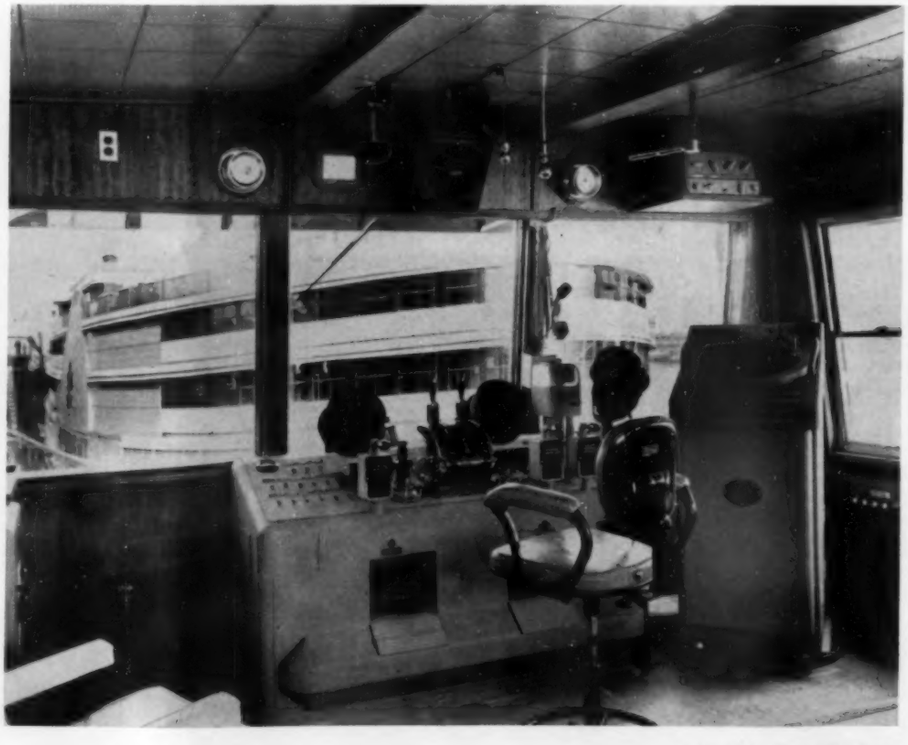
Because of the increase in power obtained by the effective utilization of turbocharging in these engines, there is a lower initial and installation cost per horsepower, as well as fewer working parts per horsepower. Turbocharging also improves fuel economy, and very importantly, tends to flatten out the fuel consumption curve at higher loads. This engine is of clean, compact design, with easy accessibility to major parts and features especially rugged design of key parts to insure long and active life in service.

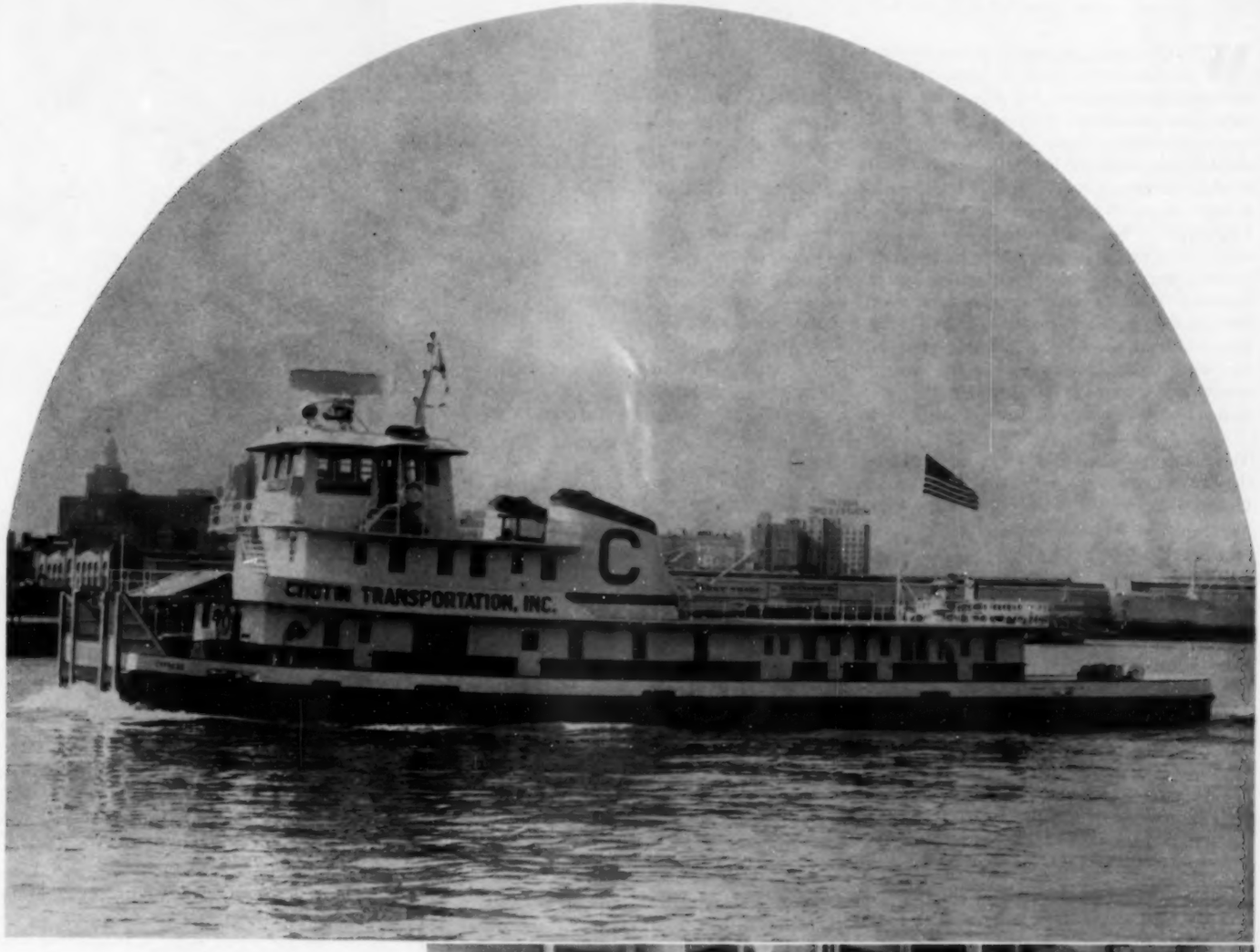
The main engines are fully controlled from the pilot house by dual lever pedestal control assembly and direct linkage mechanism. The pilot house combines beauty of interior finish with well arranged controls and equipment of newest design, giving the operator practically fingertip control of entire vessel at all times.

The *Cypress* is equipped with the latest communication and navigation aids. Steering is done by two independent electrohydraulic systems of non follow-up type, one for the steering rudders and one for the flanking rudders. Each system is driven by a 15 hp electric motor driving a V line pump supplying pressure to hydraulic rams arranged in push-pull. There is an electric operated valve to transfer the energy from the flanking system to the steering system as an auxiliary power source and control for steering. In trial runs, the rudders were turned from hard-over to hard-over (80°) in ten seconds with vessel at full speed ahead or astern, providing optimum maneuverability.

The living quarters are large and designed for functional beauty and comfort. The arrangement of cabins is as follows: Main deck: Three staterooms with connecting bath forward; two state-

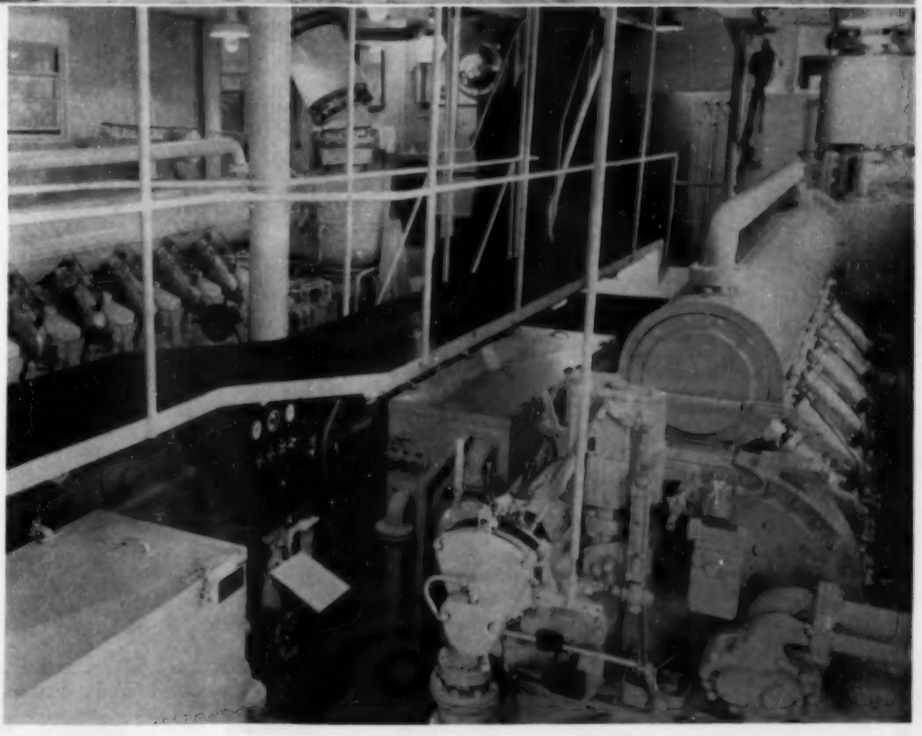
Pilot house view of the *M/V Cypress*, combining beauty of interior finish with well arranged controls and equipment of newest design, giving the operator almost finger-tip control of entire vessel.





The *M/V Cypress* with 4200 horses in her trim hull, is owned and operated by the Chotin Transportation Inc., New Orleans, La.

rooms with connecting bath aft and an additional separate stateroom with private bath for the cooks. Upper Deck: Two staterooms with connecting bath port; one stateroom with private bath for master starboard; one guest stateroom aft with private bath, built-in dresser with mirror and fitted with twin single berths; one large room fitted out as lounge with settee, chairs and water cooler, starboard. All staterooms, except guest stateroom are fitted with double berths providing total berthing for twenty persons. Year 'round air conditioning and heating is provided by three separate built-in systems, each served by a 3-ton unit.



Engine room view of the two main propulsion General Motors Model 12-498 turbocharged diesel engines, each rated 2100 bhp at 850 rpm. Note Marquette Governor, Briggs lube oil filters, and DeLaval turbochargers.

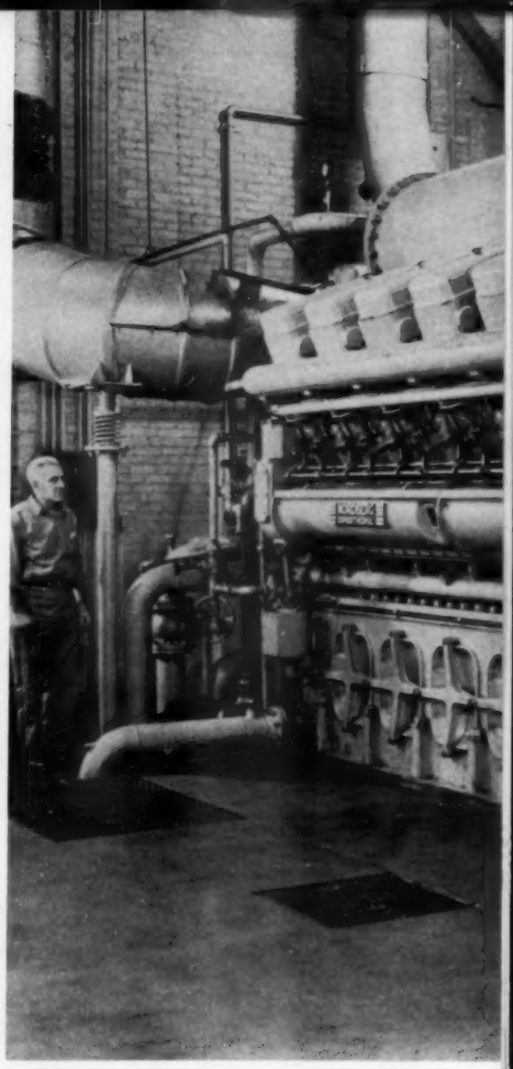
WOODSTOCK, ILLINOIS

WHEN residential customers and industry alike are solely dependent upon their own municipal plant for power, you can't have all your eggs in one basket. Mr. William Day, City Manager at Woodstock, Illinois compares their Power and Light System to the hole in a doughnut. The System is completely independent and has no tie-in with the power utility which surrounds them. Responsibility for uninterrupted power service rests with municipal plant and they have now diversified their power production equipment. A Nordberg Supairthermal Duafuel engine rated 3660 hp, 2610 kw at 514 rpm was installed in the plant which previously had only steam equipment. The three turbine plant's capacity was thus increased from 14,000 kw to 16,610 kw, more than double peak demand.

The Nordberg Duafuel engine was originally purchased as an emergency and standby unit to meet these considerations. 1. In case of a sudden, complete boiler or turbine failure, it can be placed on the line in a matter of minutes and can supply the total power needs for the total residential customer load. 2. In case a turbine experiences difficulty in carrying its full rated load and must be shut down, it takes 60-120 minutes to cut-in a standby turbine. The diesel engine-generating unit can quickly meet the load demand during this critical period. 3. It can be placed on the line quickly to meet peak loads when the two low pressure turbines are not standing by for quick cut-in. The Nordberg Duafuel engine has fulfilled these needs and more—it has demonstrated its economy of operation on natural gas to such an extent that it has been used as a base load unit during summer months. It generates about 10 per cent of the monthly production of over 3,100,000 kwh and is helping to lower costs of the entire operation. The Power Plant Report for October shows the following comparison in fuel cost per kwh generated:

Average Fuel Cost/kwh - Steam Turbine	.540 mills
Average Fuel and Lube Oil Cost/kwh - Nordberg Duafuel Engine on Gas	.495 mills
Combined Average Fuel Cost/kwh generated	.537 mills

The Duafuel engine is especially economical during the summer when natural gas is available at 3.81¢/therm, less than one-half the normal cost of diesel oil (12.131¢/gal.). Woodstock may have year-round gas availability in two years when gas pipeline capacity is increased. However, even when running on diesel oil during the winter months, the Nordberg engine is the most economical unit in the plant especially for short peaking purposes, and is seeing increased service. Three recent increases have brought the price of coal to $7.51/ton and increasing freight rates are also adding to the cost of steam power generation. Woodstock has another situation which makes it unique and also presents problems. Fifty-two per cent of the average weekday load is represented by one industrial customer—the die-casting division of the Electric Auto-Lite Company. Their power requirements for the manufacture of automobile instrument panels etc., are fairly steady, but any seasonal or hourly fluctuation, of course, immediately affects the power plant's operations.

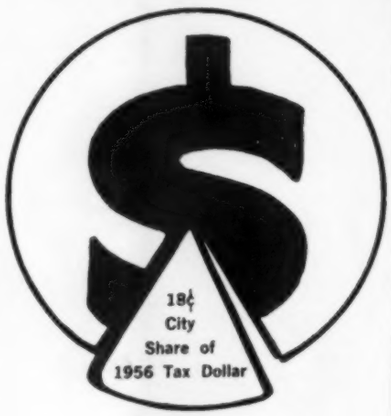


Woodstock has 3318 customers, 2896 residential and 422 commercial. The load peaks occur from 10-11:30 a.m. during all seasons and from 4:30-6:00 p.m. during the winter months. The main turbine has a capacity of 7500 kw at 80% pf and the Nordberg engine is now used to take care of all peaks which have reached 8200 kw or more during the winter. Normal procedure is to take the load on the turbine to the point where the engine can be run at one-half to three-fourths load rating. Woodstock has 40 miles of transmission lines which are extended 2½ miles into the surrounding country. It is located in the geographical center of McHenry County and logically became the market place for the farm families and the County Seat. McHenry County is the leading dairy county in Illinois and ranks 18th in the Nation in the value of dairy products sold. The light industry located in Woodstock includes R. C. Allen

FINANCIAL REPORT

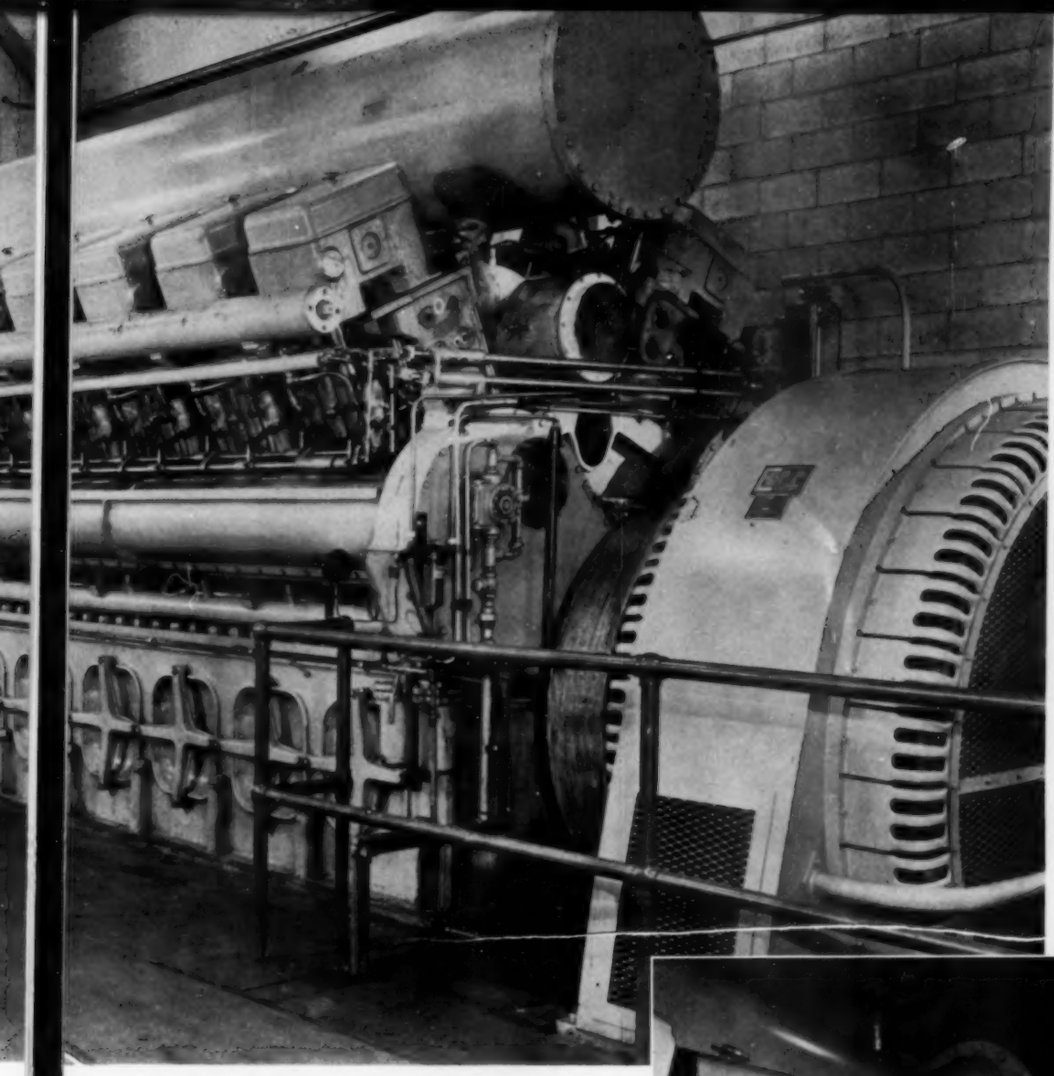
This is how we got it (1955-56).

LIGHT AND POWER FUND	
Light and Power Sales	$ 705,526.97
Other Light and Power Income	8,148.38
WATER AND SEWER FUND	
Water and Sewer Sales	170,444.58
Other Water and Sewer Income	3,583.20
GENERAL FUNDS	
Property Taxes	85,996.67
Sales Taxes	11,605.73
Licenses and Permits	7,505.68
Revenue from other Funds	18,325.40
Police Fines	8,694.05
Franchise Tax	60,000.00
Sales and Services	7,902.87
Misc.	390.80
PARKING METER FUND	
Meter Receipts	27,038.62
Misc. Income	132.17
	$1,115,295.12



This is how we spent it. (1955-56)

	Total	Commodities	Personal Services	Repairs & Maintenance	Utilities & Services	Capital Outlay	Balance
LIGHT AND POWER FUNDS	$ 713,675.35	$201,855.61	$117,090.12	$25,628.15	$ 33,809.42	$136,383.58	$198,908.47
WATER AND SEWER FUNDS	174,027.78	23,842.89	51,864.84	6,796.00	32,737.51	41,734.95	17,051.59
GENERAL FUNDS							
General Government	22,714.09	60.13	8,302.50		11,390.33		2,691.13
Police Dept.	33,690.79	2,502.89	26,105.92	697.69	2,040.54	2,244.00	99.75
Fire Dept.	9,925.91	321.83	6,013.00	735.79	838.57	2,010.72	6.00
Street Dept.	58,536.98	2,213.70	24,690.29	12,899.70	3,761.17	12,448.91	2,523.21
City Hall	3,776.38	665.97	1,908.44	123.80	835.20	48.37	194.60
Health Dept.	1,330.40	1,138.40	192.00				
Engineering Dept.	7,364.93	281.74	6,025.10			347.31	710.78
Garbage Disposal	20,160.73	14.78		283.15	18,970.00		892.50
Public Parks	21,094.40	1,089.11	11,725.63	2,039.48	619.96	4,913.70	706.52
Working Cash Fund and Reserves	21,826.59						21,826.59
PARKING METER FUND	27,170.79	747.57	8,199.78	539.22	585.41	829.01	16,269.80
	$1,115,295.12	$234,734.62	$262,117.62	$49,743.28	$105,588.11	$200,960.55	$262,150.94



The first diesel unit to be installed in Light and Power Plant at Woodstock, Illinois is this four-cycle Nordberg V-type Duafuel engine, rated 3660 hp at 514 rpm, driving a 2610 kw Elliott generator.

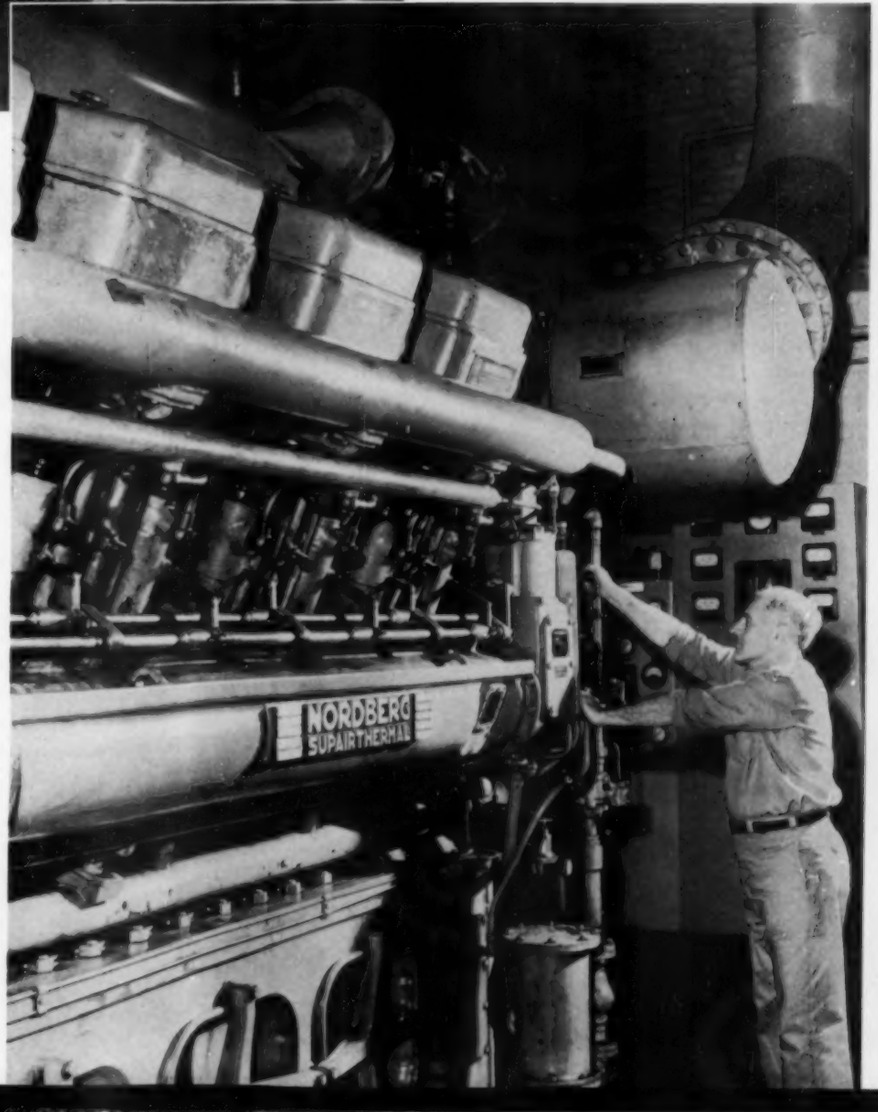
(business machines) and the Morton Salt Co. Research Laboratory and they help to give the community a healthy balance.

In recent years, the unusually pleasant residential sections in and around Woodstock have attracted young city and suburban families from the Chicago area. Regular commuter trains make the 52 mile run to the Loop each day with the happily relocated business men, while their children attend the modern Westwood School, recognized as one of the best new schools in the nation. The city's population is now 8200 and included among Woodstock's citizens is Chester Gould, creator of the Dick Tracy comic strip. Mayor James H. Cooney is proud of this comfortable mid-western town—from the old Opera House located on City Square to the new sewage treatment plant on the edge of town. The City's Financial Report for the last fiscal year (See Table Illustrated) shows that the Light and Power System produced 64 per cent of the city's income and 75 per cent of its favorable dollar balance. Uninterrupted service in good weather and bad and these favorable earnings are two important reasons why Woodstock's citizens like their independent municipal system. The protection and economy obtained by the addition of the Nordberg engine is the latest example of how the well-run community anticipates requirements and is ready to efficiently handle any emergency.

List of Equipment

Engine	Nordberg Supairthermal Duafuel rated 3660 hp at 514 rpm. 16 cylinders, 13 in. x 16½ in.
Generator	Elliott - 3262.5 kva, 2400/4160 volts, 3-phase, 60 cycle.
Turbocharger	De Laval
Intake Air Silencer	Burgess-Manning
Intercooler	Young
Fuel Injection Pumps	Bendix Scintilla
Fuel Filter	Nugent
Lube Oil Pump	Roper
Lube Oil Purifier	Purolator
Lube Oil Cooler	Ross
Alarms	Viking
Pyrometer	Alnor
Safety Controls	Fulton Sylphon

A pull of the starting lever by Operator Karl Schacht and in a matter of minutes the compact Norberg Supairthermal engine will deliver 2610 kw for base load, peaking or emergency service. Burgess-Manning air intake silencer attached to the DeLaval turbocharger can be seen above operator and Alnor pyrometer on engine control panel in background.



Caterpillar DW20 Tractor and "low-bowl" Scraper picking up some fill along the shoulder to spread on the sub-base.

Western Contracting Corporation's batch plant—a remodeled Johnson—being filled by a Bucyrus-Erie 34-B Dragline with a NHRIS Cummins diesel. This spot was as busy as Times Square, with a steady stream of trucks bringing raw materials in and carrying cement "makins" out.

RELOCATION OF U.S. 23

By J. W. BROWN

OUR attention was first called to the spate of activity going on by the cloud of dust and buzz of wallowing scrapers in a field just east of one of Michigan's main north-south traffic arteries. We were on Route U.S. 23 coming into Ann Arbor, the attractive seat of the University of Michigan, from the north. We learned later that the fuss was being kicked up by five Euclid TS-18 scrapers—the "twin engine" variety with 18 cu yd capacity, one Euclid S-7 and a LeTourneau-Westinghouse "pan" pulled by a Caterpillar D6 tractor. The Eucs of course were all with GM Detroit diesels.

Unfortunately by the time we got back with our camera a week later most of this rough grading equipment was gone. This road building job, we learned, was being done by Western Contracting Corporation of Sioux City, Iowa. This is a big outfit, and with other jobs going in Topeka, Kansas; Omaha, Nebraska; Kingsland, Georgia and Pierre, S. Dakota, they keep all equipment on the move. This particular contract—a $1,225,000 job involving approximately 608,000 cubic yards of excavation—was to result in a new 4-lane divided highway paralleling the existing Ann Arbor-to-the-northern-tip-of-Michigan highway on the first (southern) leg of 5¼ miles.

The first thing we ran into on our subsequent picture-taking trip was a good-sized overpass being built in the northern outskirts of Ann Arbor by the Jutton-Kelly Company of Dearborn, Michigan. This overpass will allow a relocated (U.S. 12) east-west highway to duck under the relocated U.S. 23 right where it "takes off" from the outskirts of Ann Arbor. The overpass itself was a $225,000 contract calling for two abutments and three piers 50 feet apart, the whole to be covered with pre-stressed concrete beams. We were treated very cordially by Superintendent Ben Smith on this job. The only diesel equipment being used here however was a 40-ton model 3000 Manitowoc crane with a D 13000 Caterpillar engine and a "Cat" D7 bulldozer. When we were there the Manitowoc was just loafing along on the work of filling in to the abutment with a 1-yard dragline bucket.

Proceeding north, we passed a huge maintenance and equipment storage yard and a batch plant, about half way up the 5-mile project. Then, a little farther along, two paving machines were together laying a 12-foot strip of 9-inch concrete at a rate of about 3500 feet a day. These two spots, the batch plant and the area around the paving machines were bee-hives of activity. Raw materials were being rushed to the batch plant by private contractors in a constant stream of tandem trailer Mack and International trucks. A whole fleet of smaller trucks was dashing from the batch plant to the paving machines and back again.

We finally found the field headquarters building of Western Contracting Corporation near the northern end of the project. It was here that Project Manager M. G. Challer gave us all the vital statistics we needed except the equipment list which we obtained from the Superintendent's office back at the maintenance yard.

This is the diesel equipment employed on this job: 5 Allis-Chalmers HD 20 crawler tractors with 6-110 GMC diesels. 9 Caterpillar D8 crawler tractors. 1 Caterpillar D6 crawler tractor with a LeTourneau-Westinghouse scraper. 1 S-7 Euclid scraper with a 6-71 GM Detroit diesel. 5 Euclid TS-18 twin-engine scrapers. 2 Euclid water wagons with 6-71 GM Detroit diesels. 5 Caterpillar graders. 2 54-B Bucyrus-Erie draglines with NHRIS Cummins diesel (one at batch plant & one at borrow pit). 1 22-B Bucyrus-Erie crane with a Caterpillar diesel. 1 10-inch Carver water pump with a 4-71 GM Detroit diesel. 2 Jaeger air compressors with UD 14A International diesels. 2 D315 Caterpillar generators. 2 34-E Koehring pavers with 4-71 GM Detroit diesels. Between the bridge at the southern end of the strip and the centrally located batch plant, about .7 miles from the right-of-way was the borrow pit where one of the two 54-B Bucyrus-Erie draglines was loading fill for subgrading. This was the only borrow pit needed for the job, because as Mr. Challer explained it was a "balance fill" job, with much of the fill coming from the excavating necessary to level out the road grade.

The new four-lane highway will have a 250 foot right of way, 8 foot shoulders and a 30-foot "boulevard" strip in the center. It was started July 16, 1956, and the contractors finished up the paving in the late fall. Miscellaneous work, however, is carrying over well into 1957 to complete this relocation project of U.S. 23.

One of 5 Caterpillar graders used on the job is this No. 12 machine grading the sub-bare near the pavers.

Koehring Model 34-E Paver with a GM Detroit Diesel 4-71 engine dumping a batch of wet concrete for one of the 12-foot strips. Two of these were kept busy on the job.

PAPA GUY–THE THREE-WAY TOWBOAT

By A. D. BURROUGHS

TAKE a little from a harbor tug, add a portion of seagoing vessel, combine with a large amount of inland river towboat, mix with a mountain of research, engineering knowledge and design, shake well with plenty of trial runs. The result is the new three-way diesel towboat, *Papa Guy*, built by Dravo for Steuart Transportation Co., subsidiary of Steuart Petroleum Co., a craft with design and equipment approved by the American Bureau of Shipping and the U. S. Coast Guard for operation on rivers, bays, and harbors.

Many inland river men are already predicting that this unique, versatile craft may well be the grandpappy for river boats of the next era. And as one enthusiastic admirer put it, "You name the problem or the job, and this towboat will handle it."

Named for Mr. Guy Steuart, founder of the petroleum company in 1904, Dravo built this 90 ft, 980 hp vessel to answer many of the general long encountered problems as well as the specific problems for the work the boat is to perform for its owners. It combines the traditional basic river towboat design with basic design from the harborboat vessels, with extensive testing from the research program at Netherlands Ship Model Basin in Wageningen, Holland.

To serve as a pusher, the traditional work method in use on inland waterways, the pointed harbor tug bow is in a modified spoon shape. The deck at the bow is almost as it is in the mid-body of the boat, giving it an unusual appearance on the water. Two heavy steel towing knees are built into the bow, one at each corner.

Comes a pulling chore, the traditional work method used in bays and harbors, this craft can go to work, using the double towing bitt fitted on the aft deck, to which the hawser is attached. This towing bitt, located well forward of the steering rudders, provides maximum control over the tow.

To beat the bridge problem, a specific obstacle created by the 11th Street Bridge over the Anacostia River in Washington, D. C., a bridge which is not opened during vehicular traffic peaks, often causing tugs to be delayed three-to-four hours, the *Papa Guy* is designed with a pilothouse of a height low enough to clear this bridge, with the radar antenna and the stern running light mast hinged, in order to lower this equipment when passing under this bridge.

Additional unusual and rare features, designed to increase the working efficiency and safety of the crew include the internal passageways, giving access to all quarters. A quickly noted feature is the portholes and the dutch-type doors in the main deckhouse, instead of the usual inland riverboat type windows and doors, which is expected to give increased protection from the spray. The considerable sheer forward of the hull, and the extra freeboard for operation in rough waters is another feature seldom incorporated in vessels plying the inland waterways trade.

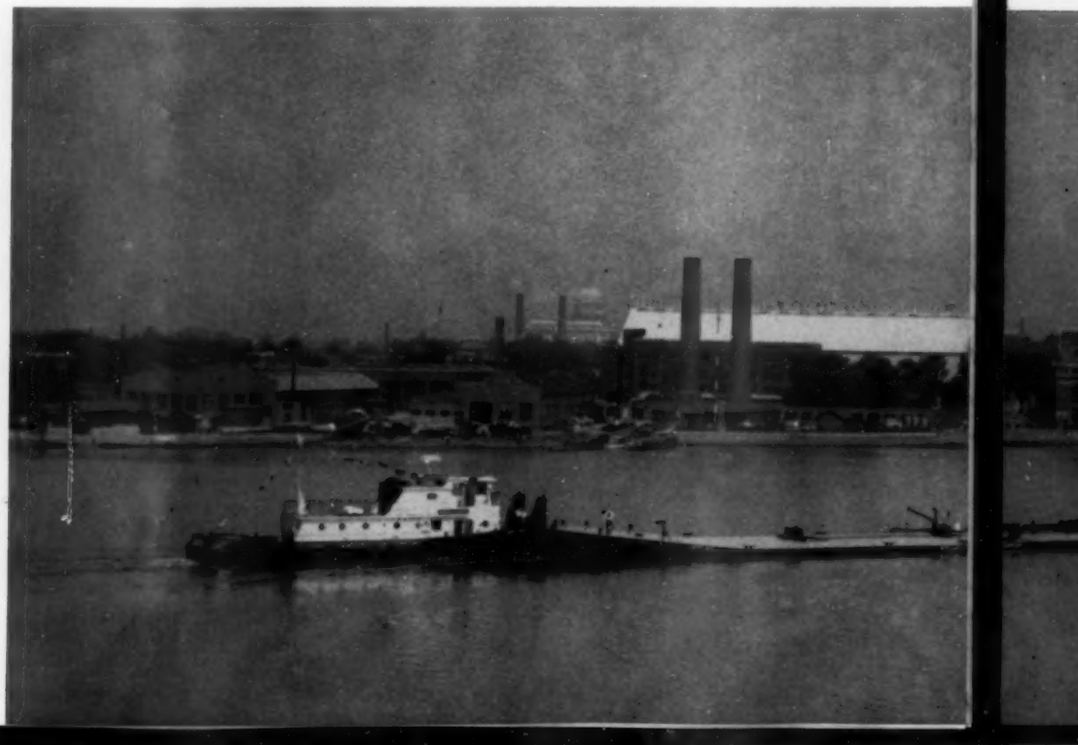
Additional ventilation, a missing feature in many vessels, is another item for this new craft. Powered exhaust fans do the job for the galley, as well as for the engine room.

The well-lighted, well-ventilated engine room, the heart of successful and profitable performance for any vessel, is the home of the main engines, the two turbo-supercharged 12 cylinder Caterpillar engines, each rated at 490 hp at 1,225 rpm. The engines are permitted to run continuously in one direction by the reverse-reduction gears. Both throttle and reverse gear of each engine are controlled by a single lever pneumatic system in the pilothouse. Two Caterpillar diesel-driven generators sets provide 120/208 volt ac current for the electric power.

Operation efficiency is expected to know another boost, due to the after hull form design, which provides a smooth and ample flow of water to the two 6 ft diameter, three-bladed manganese bronze propellers mounted in welded steel Kort Nozzles. This arrangement, combined with the six rudder system, with three rudders for each propeller, two forward and one aft, is expected to combine for increasing the towing efficiency as well as aiding the maneuverability, particularly when moving astern or sideways with a tow.

The two steering systems, one for flanking rudders, one for the steering rudders are both controlled by hydraulic rams from the pilothouse by separate levers, which indicate the position of the rudders

Guy T. Steuart, president of the Steuart Motor Company, Washington, D.C., Mrs. Guy Steuart, along with Mrs. Curtis S. Steuart, wife of the Petroleum company's president, officially send the new unusual boat into action, the first of the company-owned boats for inland river service.



***Papa Guy*, new three-way boat designed for service on inland rivers, bays and harbors is seen here near Washington, D.C. with low pilothouse, radar antenna and stern running light hinged for lowering to pass under the 11th Street Bridge over the Anacostia River.**

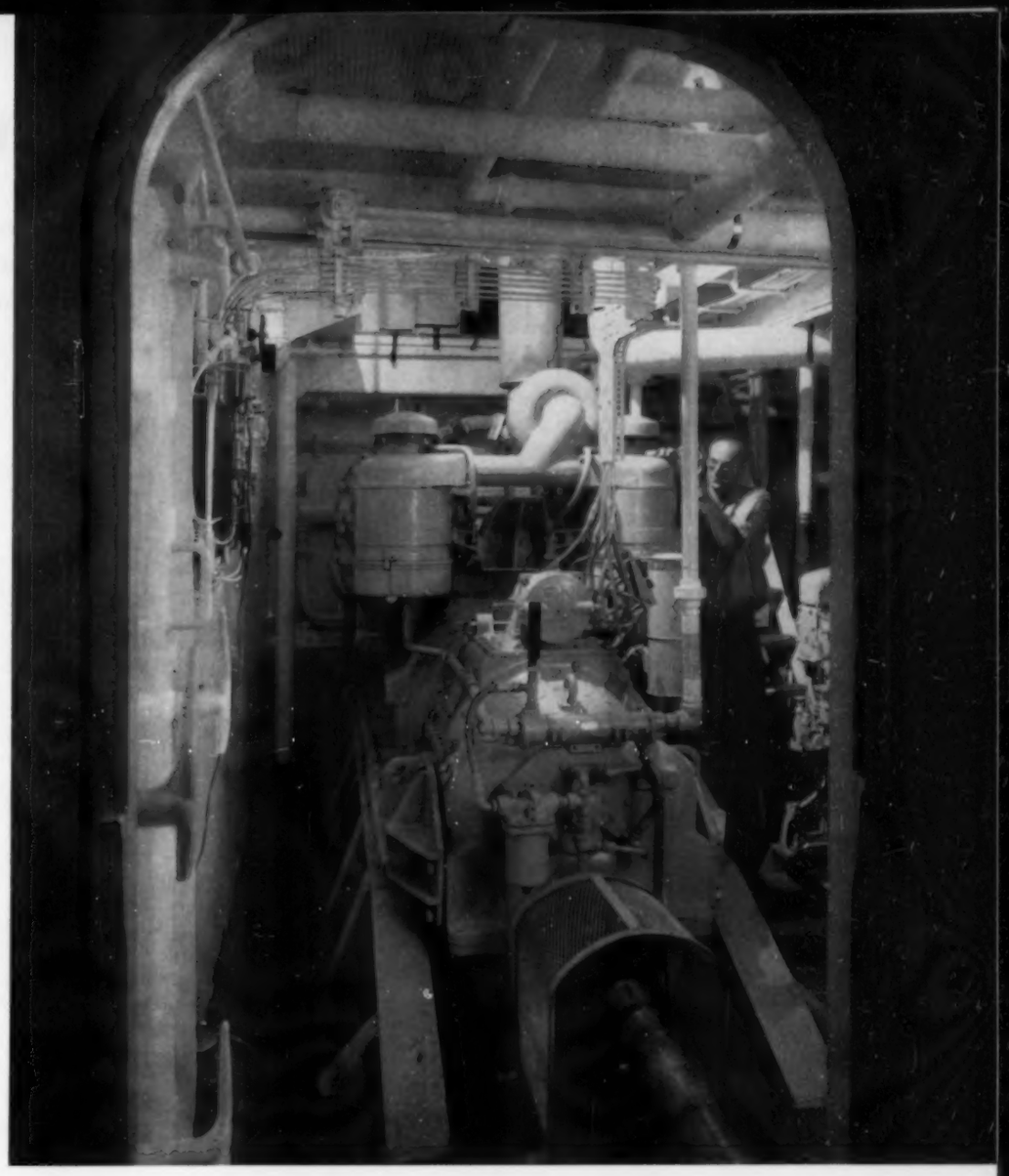
at all times. Hull depth is 10½ ft, operating draft is 7½ ft and the beam is 26 ft.

These specific features, along with the power provided by the main Cat engines will team up to enable this new boat to handle two 20,000-barrel tank barges per trip. Present plans call for 20 round trips per month between Piney Point, Maryland, and Washington, D. C., on the Potomac River for eight months of the year. The barges of the craft's tow will be loaded with petroleum products at the same wharf where the ocean tankers discharge their cargo for Steuart.

During the off season, the boat will be put to work for delivery of gasoline from Philadelphia to Steuart's Piney Point plant and for occasional runs to Washington, D. C., making a full year's work from the versatile features and dependable power on this craft.

Sponsor of the new towboat was Mrs. Guy T. Steuart, wife of the president of the Steuart Motor Company, Washington, D. C., serving with her aid, Mrs. Curtis S. Steuart, wife of the petroleum company's president.

The addition of the *Papa Guy*, the first company-owned vessel, is a big step from the days when Steuart Petroleum delivered coal and ice to Washington, D. C. via donkey carts. In 1927, the firm entered into the fuel oil business, constructing three 20,000 gallon storage tanks. All oil was shipped by rail. After World War II residential sales were discontinued, and the company now wholesales exclusively. Since establishing their 63,000,000-gallon tank farm and ocean tanker unloading facilities at Piney Point in 1950, distribution has been handled by chartered tugs and barges. The *Papa Guy*, a small powerful and versatile vessel will be watched with interest by all inland river folks, and it will play its vital role in the company's future operations.



One of the pair of 12 cylinder turbocharged 490 hp Caterpillar diesels installed in the roomy engine room of this fine three-way tug. Snow-Nabstedt reverse-reduction gear in foreground.

The usual harbor type pointed bow is modified into the spoon shape bow shown here, with the two heavy steel towing knees built into the bow for traditional inland river push work. A double towing bitt is fitted on the aft deck, for attaching a hawser for harbor and bay work methods of pulling making this boat a three-way duty craft for the owners.

EVERYBODY WANTS TO BUILD ROADS

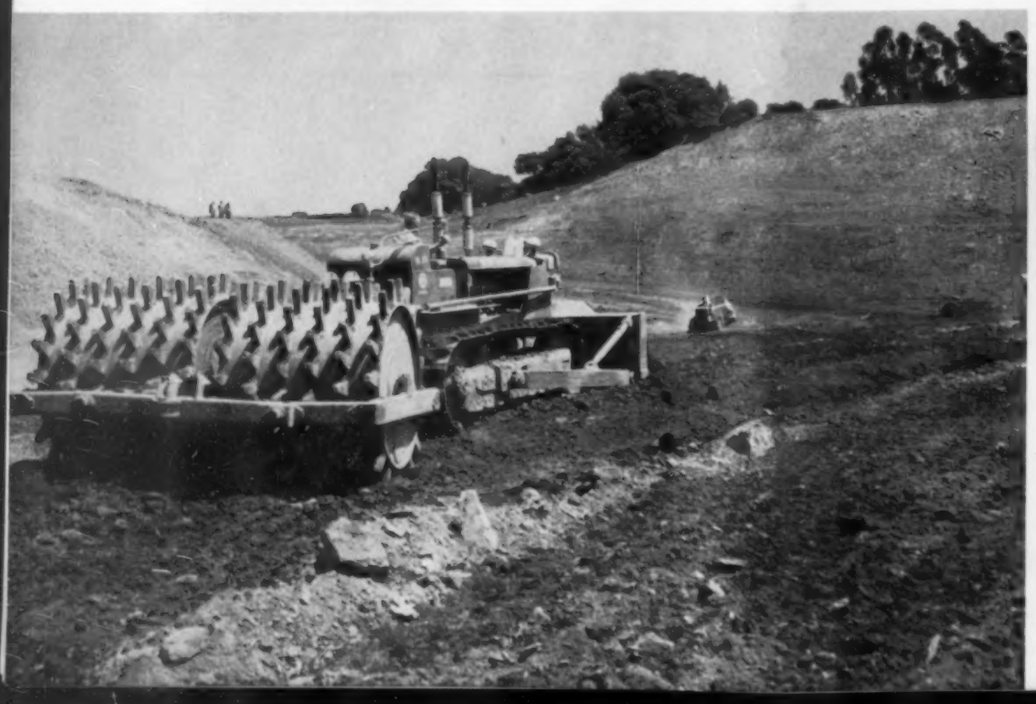
U.S. Need for 100 Billion-Dollar Highway And Street System Insures Rugged Competition Among Old and New, Big and Little Manufacturers.

By F. HAL HIGGINS

Everybody in the road building industry agrees that it's a diesel-driven equipment game. A survey at this stage shows those U.S. manufacturers who have pioneered diesel tractors are either leaders in heavy dirt-moving equipment or are trying to get into this field to balance their slump in farm sales. The heavy construction equipment going into the fields of road and dam building, strip mining, pipe line construction and logging represents development and survival of the fittest. To supplement the writer's recollections in covering some 29 years of the industry's machines from mule to diesel, he took a day off for a two-call pair of interviews with top authorities in this field: Mack Woolridge, head of American Tractor Equipment Corporation, out on San Leandro Boulevard in Oakland, has been inventing, building and selling heavy dirt-moving equipment for nearly a half century. The second interview of the same day was with Prof. Frank A. Nikirk at the University of California. Nikirk's engineering career covers railroad construction, city streets and water supply, engineer with a lumber company, Caterpillar Tractor Co. industrial sales, U.S. Government, Thew Lorain cranes and shovels, and an International dealership at Albany, N.Y., before he was picked for his present post to teach prospective engineers the practical application of their technical learning to the mangement of the heavy tools they will encounter, buy and oversee. Summarizing the high points of today's road building equipment as these two veteran authorities see it, these thoughts are worthy of study.

(1) The power that moves the road machines is practically all diesel. Truck cranes and shovels are still mostly gas engine though starting to change to diesel. (2) There's no substitute for experience in dirt moving and placing. Each successful job completed adds to the know-how of the bidder and his personnel. You can't get experience out of a book or a lecture. "You gotta live it!" (3) You can't sell diesels without service. The price of a diesel machine covers service as well as metal and labor that went into its construction. (4) It's an era of specialization, for success in this field depends on ability of manufacturers to work with the contractor, learn his problems and then develop and fit the tools and machines to his job.

(5) No two jobs are alike. California works the year round. Winning bidders on the big jobs encounter the toughest terrain and climate to give these western area contractors experience and accumulated know-how for sharper bidding in tougher competition. (6) Skilled labor operators on the job for a contractor can heavily influence the success of a line of construction equipment. With a shortage of good operators, training schools may be the answer to breaking into the big time on road building for a manufacturer with a full line of tractors, self-propelled scrapers, motor graders, etc. That well financed contractor with jobs scattered over a wide area who can hold his skilled operators from job to job has a big advantage over the small contractor who has to start with a new crew on each job. The good operator likes his job



An International TD24 doing a double job of smoothing fill with bulldozer and tamping it with a sheepfoot roller behind on McCammon-Wunderlich's 4.9 mile freeway stretch in the San Francisco Bay area.

and is proud of his skill with his machine and feels he is on a great team.

(7) The big time dirt moving operation is a ruggedly competitive frontier with crews of frontiersmen using all their accumulated know-how in tools and methods to beat the hazards of terrain, climate, weather and politics. (8) Down time gives the contractor a report card on each machine on his job. First place a contractor looks when he gets out to one of his jobs is his headquarters and field shops to see what machines are down. A machine, its distributor and its manufacturer quickly get a rating by that contractor whose reputation, success on the job and future are at stake.

Equipment Battling for the Big Jobs

Trips over the big dams and road jobs in California recently reveal these lines are being bought and operated by the leading contractors: Engines—GMC, Cummins, Caterpillar, International, Allis-Chalmers, Deere, Minneapolis-Moline, Waukesha, Continental, Fairbanks-Morse, Hercules, Mack, White, P & H, Murphy, Nordberg, Cooper-Bessemer, Oliver, Union, Ingersoll-Rand, Chicago Pneumatic, Enterprise, Worthington. More are coming up from the farm machine lines of diesel tractors as they equip with front end shovels, bulldozers, back-hoes, winches, etc., to work on the smaller road, street and local development jobs. Then, there are British and German diesels coming into the U.S. scene that will soon be out after heavy dirt-moving jobs. David Brown, Perkins, Deutz, Lanz (recently acquired by Deere & Co.) are some up-and-coming foreigners we can look for to add spice to the diesel battle for the big plums in heavy construction. In fact, David Brown is already set up with a western U.S. company headquartered at Oakland, equipped with a line of crawler tractors and scrapers ready to compete for logging and dirt-moving jobs.

In tractors, there "is a place for both wheels and crawlers," declares LeTourneau-Westinghouse, which under the first name led the field into the big rubber tired tractor field to compete against tracks some 20 years ago, just ahead of Euclid's bid with its self-propelled air tired, fast-moving scrapers that carried the loads farther and faster than was done by crawler-pulled scrapers to start a revolution. Clark and Wagner are both eagerly approaching the heavy construction field with big-tired tractors with bulldozers, front scoops, and other accessories. As Mack Woolridge puts it, "Costs of labor and equipment are now so high that every machine must be more flexible to do more jobs."

The big crawler tractors of Allis-Chalmers, Caterpillar, Euclid, International and Oliver will be joined by Case's new line acquired by American Tractor Corporation's purchase. We have seen few of the Terratracs in the West, but they have made their mark in the eastern U.S. to rull up a 9-million-dollar business in 1955, according to reports. Case has bet a stack of blue chips on this line of crawlers to balance their 105-year-old farm machinery business that has been feeling the post-war farm cut-back as have all the farm machinery companies. All have diesel tractors and are hooking up with various manufacturers of backhoes, front loaders, bulldozers, etc., to get more industrial jobs.

The big manufacturers of dirt-moving equipment have, since the end of World War II, been adding to their prime movers to give them a full line for the bid-winning contractor. Besides a diesel engine and tractor, a motor grader, front-end scoop loader, and both pull and self-propelled scraper in sizes for each model tractor are now fairly standard for crawler tractor builders. In addition, they have been either developing their own or cooperating with specialty factories to hang more attachments and accessories on their engines and tractors for more work by one machine in the hands of a skilled operator. Rippers, bulldozers, blade extensions, turbo-superchargers, torque converters, filters and air cleaners, starters, winches, etc., are getting as much research and competitive engineering as are the machines in some cases. No manufacturer dares rest on his reputation in autos, farm machinery, trucks or engines. Even the steel makers are in the battle for billions are at stake in business in the next two decades in road, street, bridge and dam construction with iron and steel reinforcing.

Allis-Chalmers HD16 dozer filling around bridge abutment on Arizona State Highway near Fry, Arizona for her owner, Arizona Sand and Rock Co. of Phoenix.

Northwest shovel with a big load for the waiting Euclid truck equipped with Cummins diesel at Coyote Dam project in the Sacramento Valley. Texaco supplies oil products to fleet of dam equipment shown here.

NEW SERVICE-RATED EXPANSION JOINTS

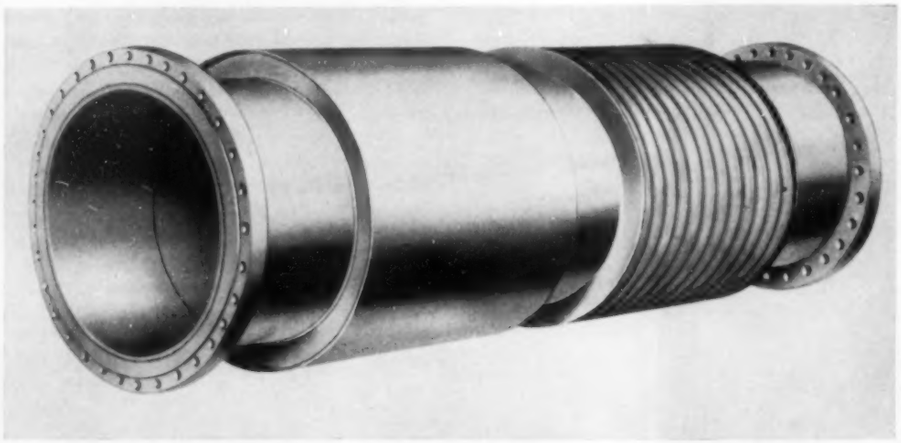
AFTER more than three years of research and testing, Badger Manufacturing Company is now offering an entirely redesigned line of packless corrugated expansion joints for use in power, heating, industrial and process piping applications. The joints, known as Badger Service-Rated Expansion Joints, incorporate the first basic expansion joint design changes to be made in recent years by the firm that held many of the basic patents on these devices so important to the diesel industry.

The new Badger Service-Rated Expansion Joints are available in several types which are classified in Series according to the pressure—temperature conditions to be encountered in much the same way that pipe flanges are rated by the ASA. Thus, joints in Series 50 are for lower line pressures while joints in Series 150 and higher are for higher pressures. The most notable design change in Badger Series 50 Expansion Joints is found in the shape of the corrugations which form the flexing member. The radically different design (Figure 1) is based on a correlation among height, shape and pitch dimension which was established as a result of extensive testing of corrugation shapes by the Research Department of Badger Manufacturing Company. The new shape gives each corrugation a more effective height which results in greater flexibility and therefore more uniform movement per corrugation than conventional types of expansion joints. In addition, the new corrugation naturally assumes an all-curve shape (dotted line Figure 1) under operating pressures and temperatures and actually "breathes" with pressure fluctuations.

Badger Service-Rated Joints of Series 150 and higher also have the improved corrugation shape found in Series 50 Joints. However, because these joints are designed for use where there are higher line pressures, they also have reinforcing rings. The design and functioning of these rings is probably the most significant improvement in expansion joint engineering made up to this time. As shown in the cross-section view of a Series 150 Joint (Figure 2), the tubular rings make metal-to-metal contact only in the "valley" of each corrugation. This design maintains the hoop dimension of each corrugation and allows it to naturally assume an "all-curve" shape (dotted line Figure 2) when under line pressure. Fabricated from wrought steel, the new reinforcing rings are substantially lighter and are able to withstand higher pressures and temperatures than conventional cast iron types.

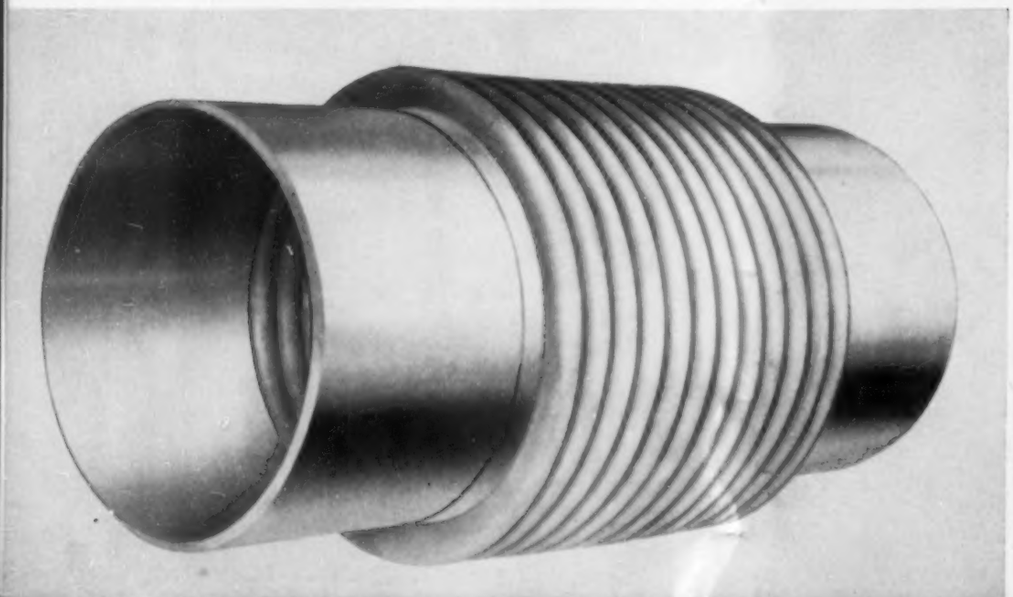
All Service-Rated Joints are available in any weldable alloy including stainless steel, Monel, Inconel and nickel for pipe diameters from 3" to 72". They are normally equipped with internal liners which streamline the flow through the joint thereby minimizing turbulence and the high frequency vibrations that result. The internal liners are generally fabricated from the same material as the corrugated member. Badger Service-Rated Expansion Joints are available with either flanged or welding ends. At slight additional cost, all joints may be provided with external covering shields to protect the corrugations from damage and keep them free of cement, gravel and other foreign materials.

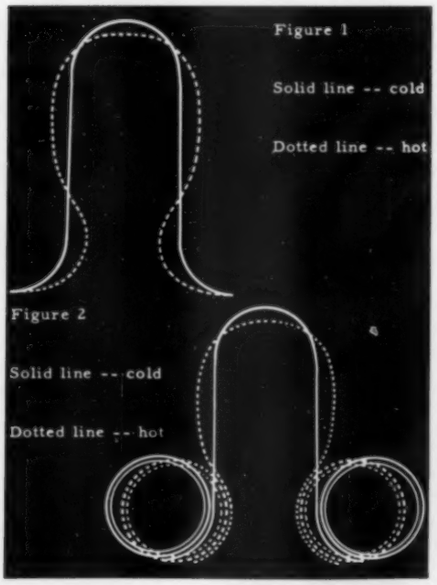
The Joints are also available in hinged, tandem or balanced models for installations in pipelines subject to angular or lateral movement alone or in combination with axial movement. Double Joints are available for applications where axial movement is in excess of the amount that can be accommodated by a single joint. In addition, Series 50 Joints are available in rectangular or other custom shapes for special applications. More complete information on Badger Service-Rated Expansion Joints may be obtained by writing Badger Manufacturing Company, 230 Bent Street, Cambridge, Massachusetts.



24" Series 150 F (flanged) Double Joint. Protective Cover is shown installed over one corrugated element. Cross-section view of Series 150 Expansion Joint showing corrugated member and reinforcing rings. (See Fig. 2)

Series 50 S-R Expansion Joint. Contour of corrugated member of Badger Service-Rated Expansion Joint. (See Fig. 1)





MARATHON CONVERTS TO HEAVY FUEL

Florida Keys Electric Coop. Plant No. 2 At Marathon, Fla. Has Run A Full Year on No. 6 Fuel At Savings of $25,518.09

By REX W. WADMAN

Marathon, Fla. Jan. 2nd. Just a year ago today, I was down here at Plant #2 of the Florida Keys Electric Coop. At that time the two big 1000 kw Superior Diesels had both been converted to use of #6 Bunker C residual fuel and operation under Vapor Phase control. It is a fine new plant, splendidly equipped and every provision made for heavy fuel operation. Marathon is but 47 miles north of Key West on the Florida Keys, but even last year at this time, the local load was building up rapidly. In fact since construction was started on the #2 Plant near the end of 1953, the local kw hr sold has increased 119%. Today the two engines are working a yearly average of close to 80% capacity running factor, so Washington has given the green light to buy a big, new engine. On Jan. 11th the bids were opened at the head office at Tavernier and, at the end of this article, I will give you details of the engine the Management has purchased—probably the largest single unit ever previously purchased in this area by R.E.A.

The residential and commercial load is building up so fast on the length and breadth of the Florida Keys, it creates a real problem to this Coop which serves this area exclusively, from just below Homestead, Fla. (which is also dieselized) to just above Key West. Quite a stretch which is growing as fast if not faster than the average of Southern Florida. At Tavernier, 43 miles north of here, is the main plant of this Coop, and Plant #1 contains a pair of 1000 kw Superiors and two Enterprise 450 kw units. The Superiors at Marathon, due to their greater economy of operation, carry the base load with the #1 plant supplying the remainder of the system demand.

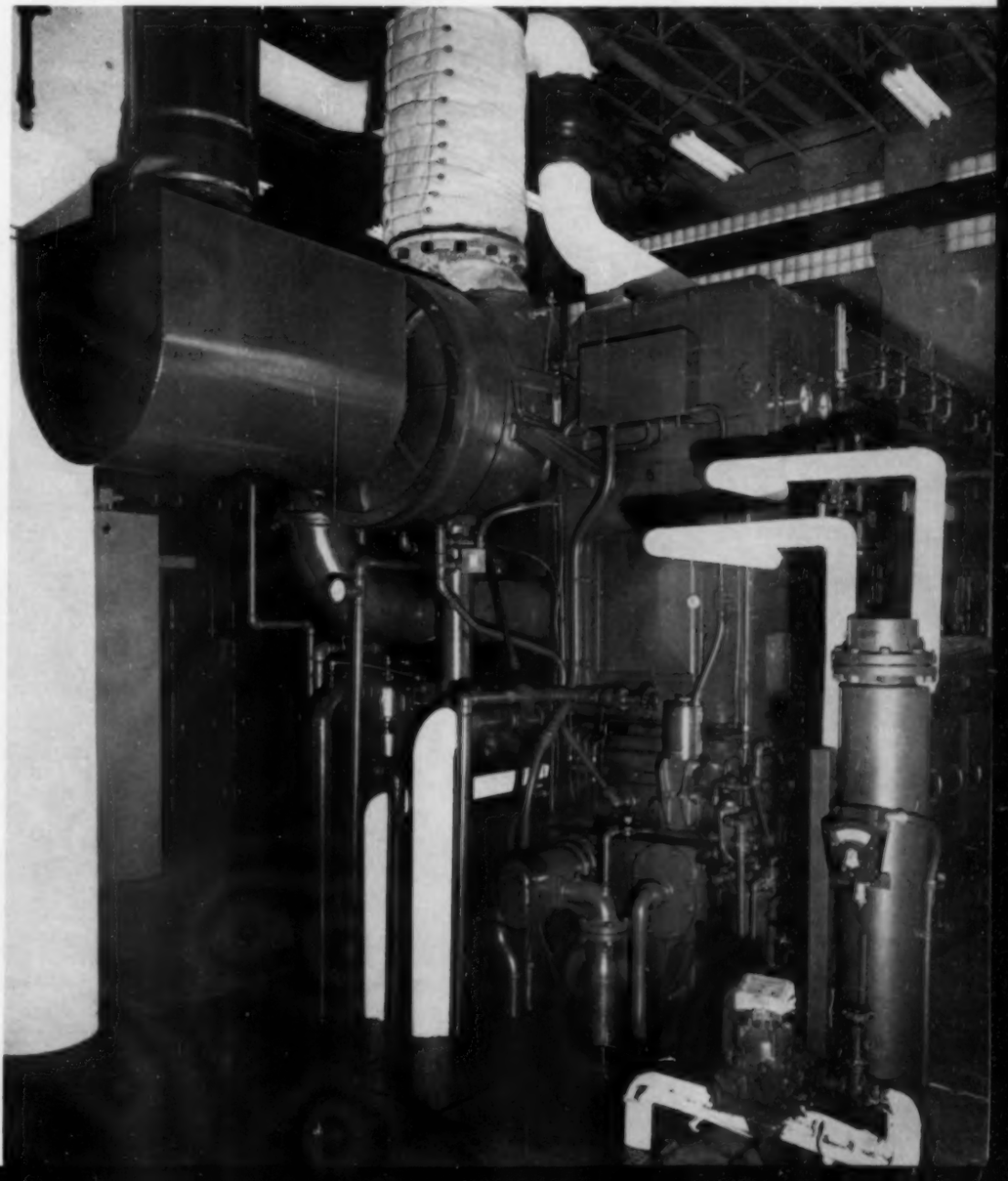
When it became necessary to build Plant #2 at Marathon, the Cooperative was very fortunate in being able to locate Mr. J. Clark Griffin, who previously worked for Mr. R. J. Dodd, who initiated the using of heavy fuels at Keystone Heights, Fla. Mr. Griffin was entirely conversant with the use of this type fuel, having handled and maintained the 3946 kw of Cooper-Bessemer engines at Keystone Heights, also the 4600 kw of Cooper-Bessemer engines at Worthington Springs. Clark Griffin came down to Marathon the first of January in 1954 and has been doing a grand job. He has faced many new problems, still has some more to lick, but he is young, experienced, and very interested in his job. The Management of the Cooperative feels that all of their problems will be ironed out.

This year, you know, DIESEL PROGRESS is presenting TWO plaques, one to the most efficient engine generating REA plant over 5000 kw and the other to a similar plant with 5000 kw or less. We will tell you the results of the 1956 operations and the winners in either the April or May issues.

Getting back to the plant here, the E. P. McLean Engineering Co. of Moultrie, Ga. who also Engineered the Worthington Springs, Fla. plant were the consultants and Wallace M. Baxter of Coral Gables, Fla. the Architect. Much credit must be given to the E. P. McLean Co. for their very efficient lay-out of the plant from both a modern and practical operational viewpoint, also their close cooperation with William B. Nicholls, Plants Superintendent in the selection of equipment. The Table which appears herewith gives you the facts and figures for the first full year of operation of the Marathon Plant after conversion to heavy fuel.

The savings of $25,518.09 for the full twelve months in fuel cost alone tells the story. I give in this Table the comparison of cost between Marathon and Tavernier, remembering that all the Tavernier units run on #2 fuel. Here at Marathon cooling is handled by a Vapor Phase installation supplied by Engineering Controls of St. Louis, Mo. Outlet jacket water is maintained between 220 and 230 degrees and the operation of these two engines on #6 fuel is simplified by the manner in which the jacket water in both engines is kept hot at all times. The control and flow chart shown in figure 1 was worked out at Keystone Heights by Dodd

Front of one Superior 1,422 hp diesel showing Air-Maze air intake to Elliott turbocharger. Bottom right—Chromolax electric heater with Rockwell meter at bottom. Lagged pipes, etc. indicate Vapor Phase connections.



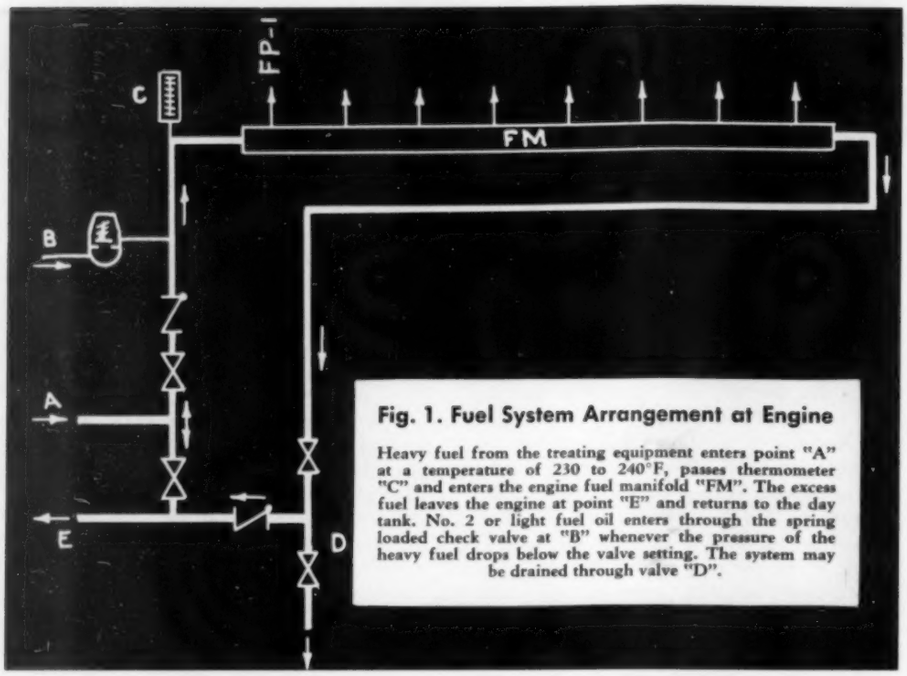


Fig. 1. Fuel System Arrangement at Engine

Heavy fuel from the treating equipment enters point "A" at a temperature of 230 to 240°F, passes thermometer "C" and enters the engine fuel manifold "FM". The excess fuel leaves the engine at point "E" and returns to the day tank. No. 2 or light fuel oil enters through the spring loaded check valve at "B" whenever the pressure of the heavy fuel drops below the valve setting. The system may be drained through valve "D".

and Griffin. The advantage of this system is when low voltage occurs due to a fault on the power lines, the low voltage protection for the pressurizing and circulating pumps automatically stops the fuel, thereby stopping the supply of #6 fuel. As soon as the #6 fuel pressure drops below 15 psi, the #2 fuel opens the spring loaded check valve and the engine continues to operate. Obviously, if this operation had to be performed manually, in a plant with more than one engine running, chaos would most certainly prevail.

The main prerequisite in successfully handling heavy fuel is to bring the fuel to the injectors clean. Here at Marathon this part of the job has been well handled from the very start of operations. A pair of model 94-21 DeLaval heavy fuel oil purifiers with standard DeLaval bowls of the corrosion-resisting type with stainless steel discs are installed. This is the analysis of the fuel oil used at Marathon, indicating these two DeLaval units are doing their usual good job.

Here are the results of tests on two samples of No. 6 fuel oil, before and after purification in DeLaval model 94 machine at 120-140 gph at 205°-

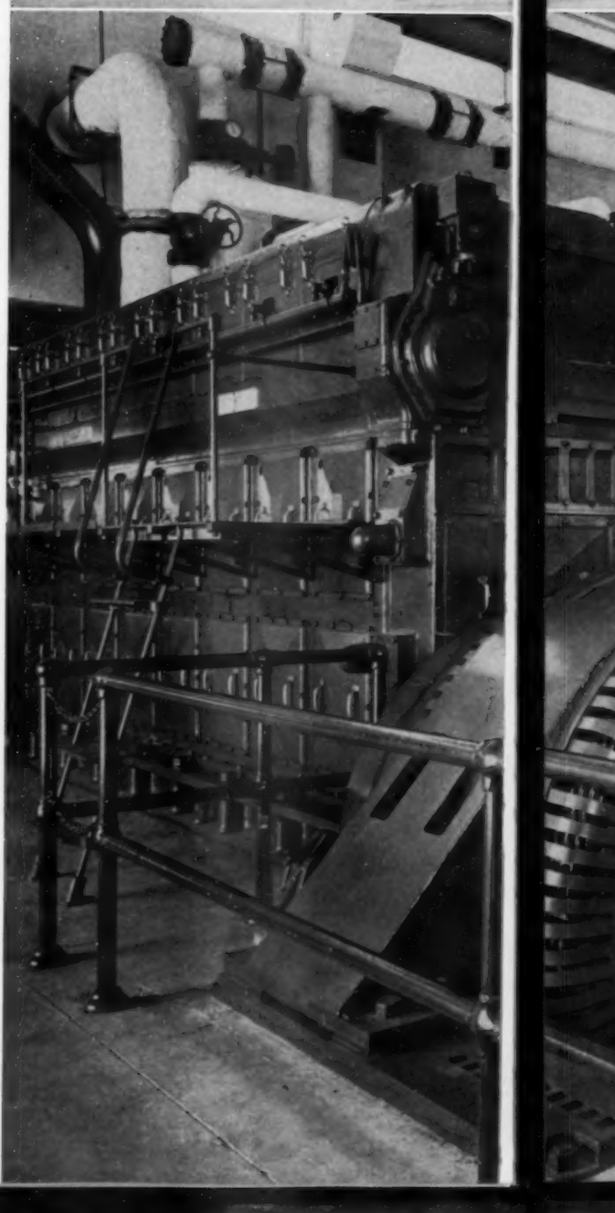
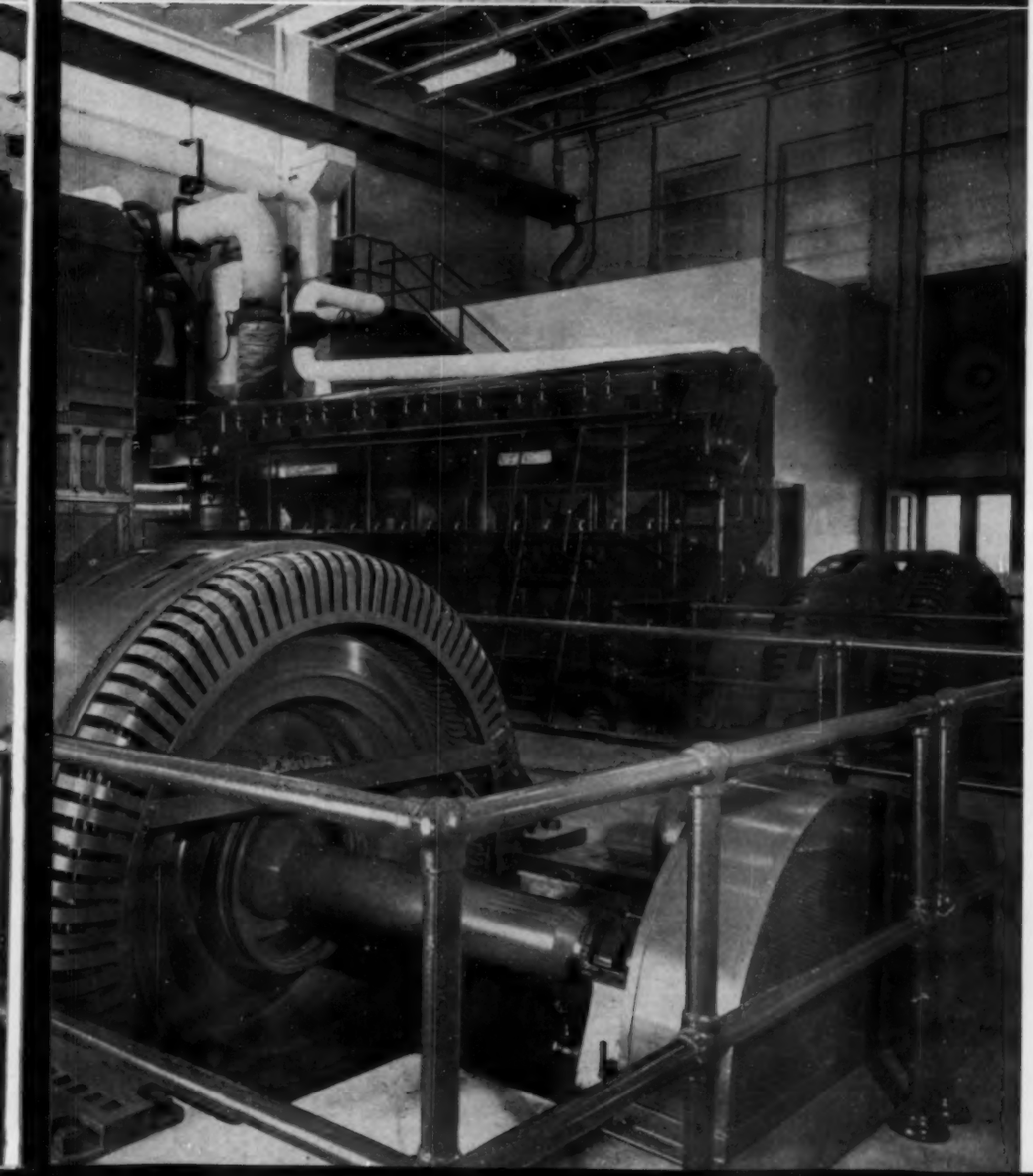


Table of Operations of the #1 and #2 Plants of the Florida Keys Electric Cooperative Association, Inc. for the period Jan. 1 to Dec. 31, 1956.

	Marathon	Tavernier	Total
Gross KWH Generated	10638410	8413870	19052280
KWH Used Station Service	384460	284710	669170
Net KWH Generated	10253950	8129160	18383110
Sta. Service % of Gross	3.61	3.38	3.51
#1 Engine Hours Run 1956	6894		
#2 Engine Hours Run 1956	6606		
Total Hours Run 1956	13500	14042	27542
Annual R.C.F. % 1956	78	63	71
Gals. #2 F.O. used	31015	627900	658915
Gals #6 F.O. used	651080		651080
Total gals. F.O. used	682095	627900	1309995
Cost #2 F.O. used	$3,597.06	$68,047.74	$71,644.80
Cost #6 F.O. used	$46,242.79		$46,242.79
Total F.O. cost	$49,839.85	$68,047.74	$117,887.59
Cost F.O. filter material	$ 153.02		$ 153.02
Total costs	$49,992.87	$68,047.74	$118,040.61
Average yearly cost #2 F.O.	$ 0.115978	$ 0.108373	
Average yearly cost #6 F.O.	$ 0.071024		
Average yearly cost #2 & #6 F.O.	$ 0.073063	$ 0.108373	$ 0.089991
KWH/F.O. gals.	15.59	13.40	14.54
Mills/KWH gross gen.	4.699	8.087	6.195
Mills/KWH net gen.	4.875	8.370	6.421
Cost of 651,080 gals. @ #2 F.O. delivered price at Marathon			$75,510.96
Actual cost #6 F.O. used			$49,839.85
Gross savings			$25,671.11
Less #6 F.O. filter costs			$ 153.02
Net savings on operation with #6 F.O.			$25,518.09



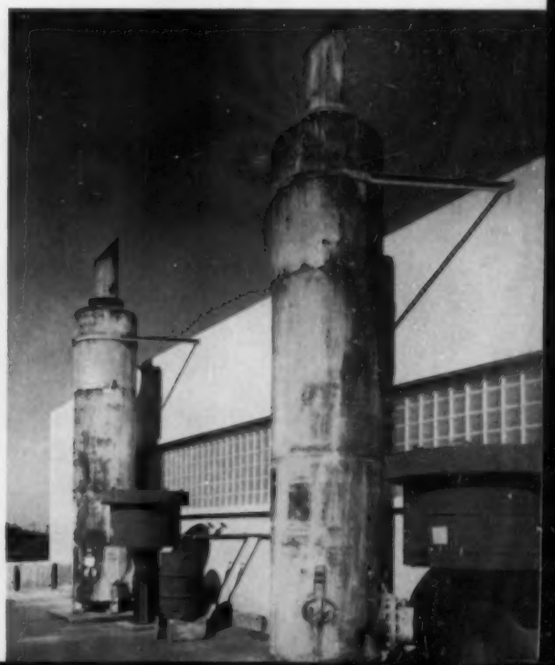
210°F. From Florida Keys Electric Cooperative, Inc., Marathon, Florida, this Pure Oil Company fuel originated at the Smith's Bluff Refinery.

	Feed	Effluent	Bowl Cake
Specific Gravity @ 60°F.	.991	.991	
A.P.I. Gravity at 60°F.	11.2	11.2	
Viscosity, SSU 100°F., Seconds	4415	4400	
Viscosity, SSU 180°F., Seconds	268	267	
Viscosity, SSU 210°F., Seconds	159	159	
B.S.&W., ASTM D-96-52-T, % by Vol.	.075	.050	
Sediment, Hot Filtration, % by Wgt.	.09	.05	51.1
Carbon Residue, % by Wgt.	12.35	12.09	
Water by Distillation, % by Wgt.	.24	.30	7.6
Ash @ 550°C., % by Wgt.	.075	.028	45.57
Sodium, Uranyl Acetate, % by Wgt.	.0061	.0054	.47
Sulphur, % by Wgt.	1.162	1.157	1.419
Oil, % by Wgt.			41.3
Flash Point, Open Cup, °F.	315	315	
Fire Point, Open Cup, °F.	360	360	

Also contributing a great deal to this successful heavy fuel system is a very complete Vapor Phase cooling system supplied by Engineering Controls, Inc. of St. Louis. Outlet jacket water temperature is maintained between 220 and 230 degrees and the operation of these two engines on #6 fuel is simplified by the cooling system which keeps the top part of the engine hot at all times, facilitating free flow of the heavy fuel.

Fuel oil used is #6 API 11.0 and the #2 fuel is API 37.0 stored in a pair of 5,000 bbl storage tanks. #2 fuel is stored in a 2500 gallon tank. Roper pumps and Ross heat exchangers work together to get the heavy fuel from the tanks, thru the two DeLavals and up to the fuel pumps and injectors. Roper helped with unloading pumps, lube oil transfer pumps, fuel transfer pumps, fuel pressurizing pumps and Ross came along with the steam condenser part of the Vapor Phase installation, turbocharger water cooler, primary fuel heater, and secondary fuel heater. The Elliott turbocharged Superior diesels are doing a grand job in helping Clark Griffin here handle the heavy load constantly surging in on his switchboard. It must not be forgotten that John Seagren, Chief Engi-

The two Superior eight-cylinder, 1,422 hp diesels direct connected to 1000 kw Ideal generators and exciters. All lagged pipes, etc. in background are part of the Vapor Phase cooling system.



Air-Maze oil bath intake air filters and Burgess-Manning snubbers outside engine room.

neer of the White Motor Company's Diesel Division and his engineering assistants have also contributed greatly to the successful operation of this fine plant at Marathon.

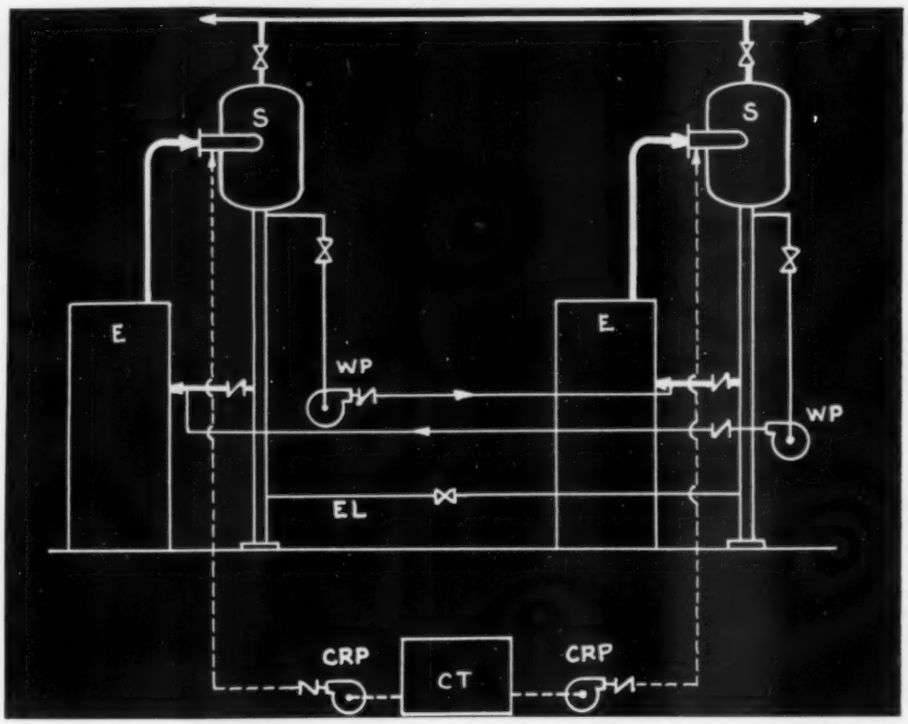
I forgot to mention earlier that Clark keeps his use of #2 fuel down to 5.2% of total fuel used. A pair of Quincy compressors supply the starting air tanks. Ideal generators rated at 1,000 kw .8 pf. 360 rpm are direct connected to a pair of eight cylinder 14½x20 in. 1,422 hp Superior diesels. Air-Maze oil bath air intake filters are on the roof along side the two Burgess-Manning snubbers. Two familiar engine room companions in a plant like this are Woodward governors and Alnor pyrometers—they are both here and so is Texaco, the lube oil used since this plant started and which is also used on the four engines at Tavernier.

For further details of equipment I refer you to the table of equipment. Good accessories are so essential to an efficient plant—Marathon is blessed with a careful, experienced selection of proven, dependable auxiliary units. I've enjoyed my visit down here to the Keys, as I did last year. The cooperation extended me by Manager Leonard Martin of the Coop, Bill Nicholls and Clark Griffin of the engineering staff has helped me a lot and is sincerely appreciated.

As promised you earlier in this article, here is the result of bids which were opened at Tavernier, Florida, on January 11th—the bid of the Worthington Corporation, Buffalo, New York, was accepted by the Board of Directors of the Co-op on January 11th, on their offering of an SW14-16 engine. This is a 16-cylinder V type rated 4190 bhp, 165 bmep, at 450 rpm, 14 in. x 18 in. bore and stroke, Vapor Phase cooled and direct-connected to a 3000 kw Electric Machinery generator. I believe this is one of the largest four-cycle engines to be installed in any REA unit here in Florida. It will, of course, be the base load engine and will be installed in the space already provided in the Marathon plant #2 without having to tear down the rear wall.

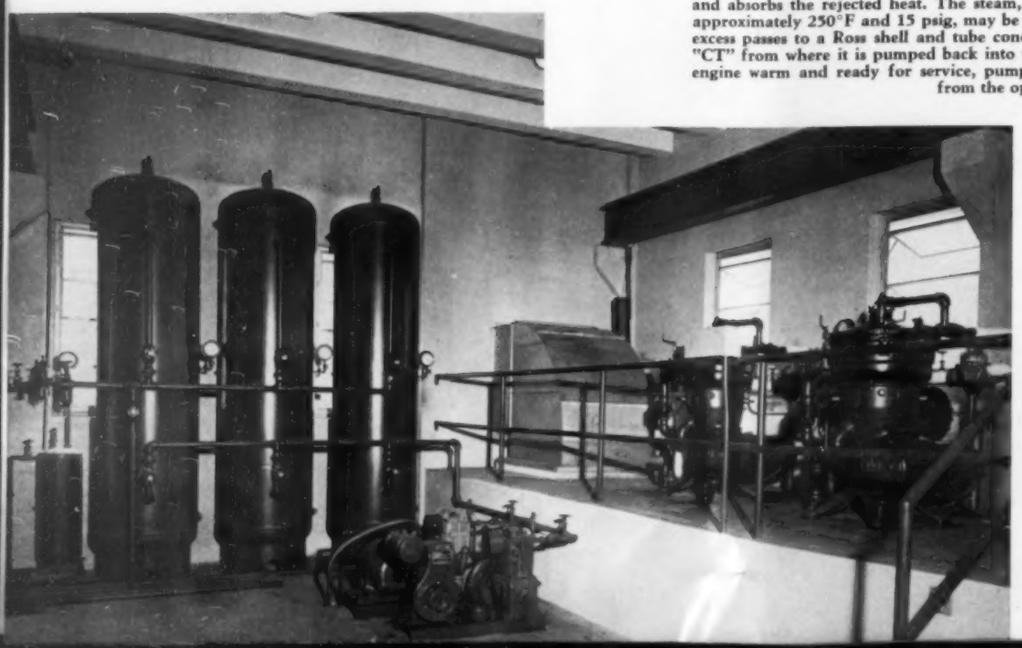
Equipment Table

Engines - Two Superior 8 cylinder 14½x20 in. 1,422 hp, 360 rpm Turbocharged.
Generators - Ideal 1,000 kw .8 pf 360 rpm.
Turbochargers - Elliott
Governors - Woodward
Pyrometer - Alnor
Lube Oil - Texaco
Lube oil filters - Hilliard and Honan Crane
Lube strainer - Purolator
Lube oil reclaimer - Hilliard
Lube oil cooler - Ross
Pre-Lube pump - Roper
Air intake filter - Air-Maze
High temperature cooling - Vapor Phase
Alarms - Mercoid
Exhaust snubbers - Burgess-Manning
Liquid level gauges - Liquidometer Jr.
Batteries - Gould
Fuel transfer and unloading pumps - Roper
Primary and Secondary fuel heaters - Ross
Fuel oil filters - Purolator
Fuel oil meter - Rockwell
Fuel oil purifiers - DeLaval
Fuel oil strainer (final) - Air-Maze
Final fuel oil heater - Chromalax Immersion
Steam condenser - Ross
Turbocharger water cooler - Ross
Switchboard - Westinghouse
Consulting Engineers - E. P. McLean Engineering Company.



Vapor Phase Cooling System

Saturated steam and water pass from engine "E" into the Vapor Phase Separator "S". The water then circulates by convection back down the standpipe, into the engine inlet and absorbs the rejected heat. The steam, being dry when leaving the Separator and at approximately 250°F and 15 psig, may be used for heating fuel oil or other process. The excess passes to a Ross shell and tube condenser. Condensate is returned to the collector "CT" from where it is pumped back into the system by pumps "CRP". To keep the idle engine warm and ready for service, pumps "WP" are employed to circulate hot water from the operating engine.



Pair of Quincy Compressors with their air tank storage units, and on platform at right, the two DeLaval heavy fuel oil purifiers.

Editor's note: Our Florida editor, Ed Dennis, was of great help to me in the preparation of this article and I want to thank him for the time and effort he put into this job. He contributed a great deal to the factual data contained in the article. Mr. Dennis is doing a splendid job for us in this state of Florida, which is rapidly becoming the Diesel Industry's most active market. His "News & Notes" every month, plus the illustrated articles on successful Florida diesel installations, are well liked by our readers.

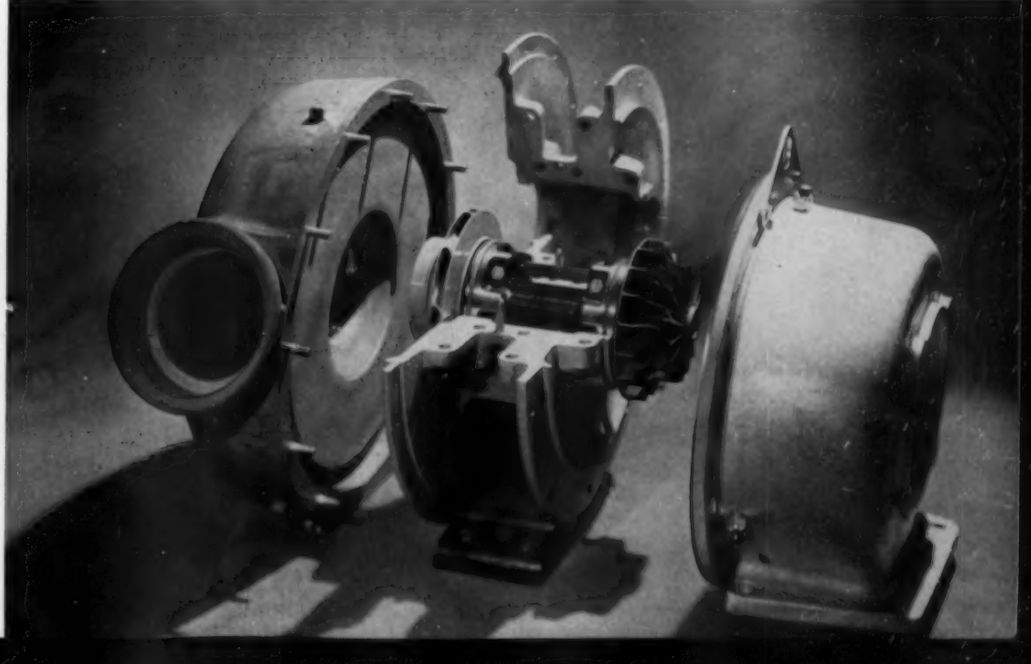
TURBOCHARGING HELPS DIESELS MOVE MORE DIRT FOR LESS MONEY

By DOUGLAS SHEARING

TURBOCHARGING diesel engines that power various types of construction equipment is becoming more and more common, and with the cooperation of Caterpillar Tractor Company and the AiResearch Industrial Division of Garrett Corporation, we have compiled some case history performances of the Caterpillar turbocharged D-9 tractor and DW 21 rubber-tired scraper to illustrate how this early user of turbocharged diesels in construction equipment has produced a tractor and scraper which give outstanding performance compared to earlier similar models. Both the D-9 and DW 21 utilize Caterpillar diesels equipped with AiResearch turbochargers, which were developed cooperatively by Caterpillar and AiResearch to meet the requirements of the Cat diesels. As you will see, in the following case histories, this new equipment is making an enviable record out in the field. Much of this success can be attributed to the effective matching of the turbocharger to the engine to achieve a high power output and maintain good fuel economy, and enabling the engine to be installed in the equipment to best advantage consistent with equipment design objectives. Contractors are interested primarily in yards moved per day, and here is vivid proof of how turbocharged diesels make it possible to move more yards per day than ever before.

Caterpillar turbocharged D9 tractor equipped with No. 9A bulldozer dozing pit run shale rock on phosphate mining operations northeast of Soda Springs, Idaho.

Blown up view of the AiResearch turbocharger similar to the ones used on the Cat D9 tractor and DW-21 scraper. Note the rugged design of compressor-turbine assembly in center.



D9 Performance Figures

The first study is in the San Joaquin Valley near Porterville, California. There is a considerable amount of land leveling in this area and Park and Deerfelt are among the larger contractors doing this type of work. Their D9 is being used to pull a No. 28 Ripper through the adobe hard pan. This hard pan is formed by irrigation water which continually washes the very fine particles out of the tilled layer down to the bottom of it. It's almost impossible for a scraper to get a load in this layer unless the ripper is used. The D9 is pulling the ripper with three teeth sunk completely into the ground—that's 28 in. deep. The D9 and ripper combination cover two and three-quarters acre per hour. Originally, the contractors used one D8 to pull the ripper and another to push when the going was extra tough. Now the big tractor does the job all by itself with a saving of about $15,000 in equipment investment and one less operator to pay.

The next job report is near Lubbock, Texas. The panhandle country was farmed by conventional methods until the topsoil worked its way down through the sandy base and left the sand on top. About ten years ago the deep plowing process was

originated to bring this land back into production. In deep plowing the original soil plus about 5″ of clay is brought back up and mixed in with the sandy layer. This process holds the land in place and also increases yields tremendously. Last year a big disc plow was developed for the D9. It has four 50 inch discs and a left hand throw which gives the operator a better view of the work. Mosel Ratliff has both D8 and D9 Tractors doing this type of work so his machines were used for comparison. The D9 plows two and a quarter acres per hour and the D8 plows one and one-half acres per hour. This is fifty per cent more production for the D9 and plow. The big tractor also has the ability to plow deeper when necessary and therefore leaves less sandy spots in the fields.

The next job study is on a large ranch in the Southwest that is using a D9 Tractor for clearing mesquite for pasture. Clearing mesquite has been going on for quite a number of years. At this ranch the job was originally done by the chaining process. Chaining uses two tractors with a large anchor chain between them and it is dragged over the land breaking off the mesquite. This is effective for about three years and the rancher usually finds he is actually losing ground rather than gaining. As a result, a root plow was developed to fit behind a D8 size Tractor. This process is effective over a ten year period but even so they couldn't keep up with the fast growing mesquite. Therefore, the next step was to build a larger root plow which was pulled by a twin D8 Tractor. The D9 now pulls the same 14 ft root plow cutting off the roots at a depth of 18 to 20 in. The D9 and root plow are reclaiming 3½ acres per hour and the extra clearance of the D9 allows it to handle jobs where the D8 Tractor used to hang up.

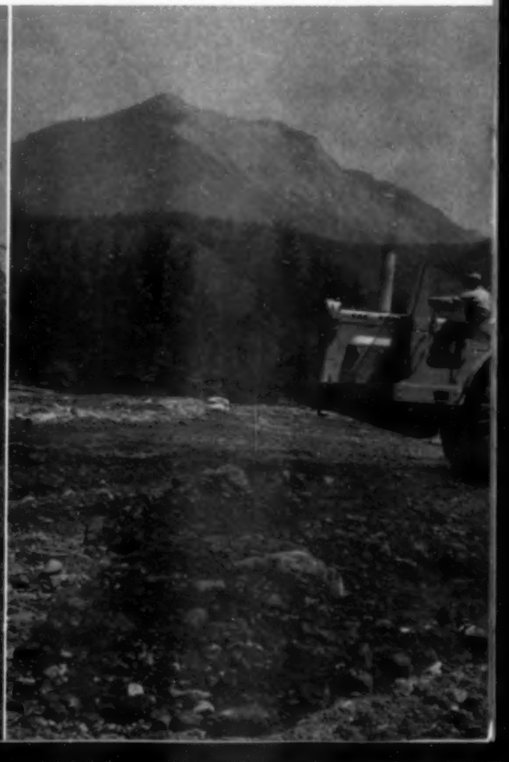
In the redwood country near Eureka, California, Hammond Lumber Company is using 4 D8s and a D9 Tractor. The D9 equipped with a winch and a D8 size arch is skidding redwood logs from the woods to the landing. The D8 arch is used because the haul roads are narrow and the adverse skidding conditions make it impossible for the D8 Tractor to fully utilize the capacity of this arch. The D9 skids a full load every time. Redwood logging where the timber is large and loads are heavy is the type of application where the D9 shows its best. Skidding at a distance between 400 and 700 ft, the D9 moves a hundred and thirty-five thousand board feet per day. This is actually over 40 per cent more production than the D8 would be able to achieve under these conditions.

Pioneering for logging roads is another type of work which can fully utilize the capacity of the D9 and is common to all logging areas. Near Thompson Falls, Montana, Oliver and Oliver Logging Co. has purchased about 50 million board feet of timber. This tract is in the Kanisku National Forest. Some of the trees are infested by the spruce bark beetle and the only way to control this pest is by cutting all the infested area. A D9 and angle blade makes the initial 14 ft cut on the 20 ft haul road. Spur roads are also built at 300 ft intervals, to open the area for a jammer skidding operation. Average production on this application is ½ mile of road per 8 hour day. This is about twice what a D8 will do under similar conditions. This production bonus is due to the big tractor's ability to remove many stumps and boulders that originally required blasting. Also, there are some obstructions which the D9 removes on the first pass and the D8 has to make 3 or 4 cleaning passes.

In mining the tremendous dozing capacity of the D9 has actually created a new type of work for tractors and dozers. The first job study is an example of this type of work. Robbins Coal Company at Oneonta, Alabama, had a problem. They

D9 turbocharged tractor is pioneering the grade for a 20 ft logging road on operations near Thompson Falls, Montana.

D9 turbocharged diesel tractor equipped with No. 9A bulldozer and a 14 ft root plow is used in clearing land for future pasture, and clears approximately three acres per hour.



wanted to increase production but their Marion 7½ yard dragline couldn't handle the extra yardage required for stripping. After a careful study of the situation they decided the most economical solution was the purchase of a D9 Tractor and Dozer to work in conjunction with the Marion dragline. Here is the way it works. A 28 in. coal seam covered with 45 to 90 ft of overburden is drilled with a 9 in. rotary and shot with acramite. The material is mostly sandstone with some shale and some sand. The top half of the highwall is pushed by the D9 into the adjacent mined out trench or box cut leaving a smooth level bench so the dragline can economically remove the remaining part of the highwall and uncover the 28 inches of coal. The D9, pushing the material on an average 15 per cent favorable grade, moves 12 yards per pass and produces 624 cu yds per hour. Compared to the dragline this is one-half the production at about one-fourth of the investment.

The Degerstrom Construction Company is working on a large highway cut for a bypass around Spokane, Washington. There two D9 Tractors are dozing the material into the hopper of an elevating loader which in turn loads ten yard trucks for the two mile haul. The tractors work on a two hundred foot section of the cut and doze the material into the hopper until final grade is reached. Then the hopper is moved and the process repeated. This gives an average dozing distance of approximately a hundred feet and a three per cent adverse grade. The two tractors are shuttle dozing in the gravelly clay. One tractor pushes a load while the other tractor is returning. Combined production for both tractors is 900 cu yds per hour.

DW21 Performance Figures

The first study is on a highway and railroad relocation job resulting from the new Coralville Dam project scheduled to be built across the Iowa River near Iowa City, Iowa. The Stewart and Rank Construction Co., Bettendorf, Iowa, has the job which involves approximately 600,000 yards of fill. Working in wet-damp Iowa gumbo and red glacial clay mixed with gravel, the Stewart and Rank equipment loads in a borrow area with a six to eight percent favorable grade, with haul and return distances 1,600 ft. Cycle time for a turbocharged Cat DW21 Tractor with No. 470 Lowbowl Scraper was 6.30 minutes with an average load of 18.9 bank yards as compared to a cycle time 6.85 minutes for a non-turbocharged DW21-No. 21 Scraper with 15.1 bank yards. The combination of turbocharged-diesel and big wide-section tires gave a 14 percent advantage in cycle time, even though the unit carried larger loads.

The second study is on the construction of 5.47 miles of farm-to-market road connection Marquez and Kosse, Texas. Howard Construction Co., Marquez, Texas, had the job which involved movement of 250,000 cu yds of material. With total haul and return distances of 2,500 yards and taking sandy clay weighing 3,100 lbs per cu yd, Howard's turbocharged DW21-No. 470 Scraper had an average cycle time of 4.43 minutes as compared to the 4.51 minutes of non-current DW21-No. 21 Scraper combination which was not turbocharged. The turbocharged DW21-No. 470 Scraper moved an average of 18 bank yards per trip as compared to 15 bank yards for a non-current unit which had sideboards. Travel time in the work cycle was about the same, which brought up the question of "where is the additional horsepower" from turbocharging. The question was easily answered when it was pointed out that the turbocharged unit was moving some 9,000 lbs of additional pay dirt. It was also noted that the return time of the turbocharged tractor when empty was 15% faster than the average time of the non-current, non-turbocharged DW21.

Cat DW 21 turbocharged tractor with No. 470 scraper working on road construction job near North Bend, Washington.

DW 21 Caterpillar turbocharged tractor with No. 470 scraper being push loaded by Cat D8 tractor on road construction job north of Oak Hill, Florida - part of project to widen U.S. Highway I to four lanes.

CUNO TAKES THREE STEPS FORWARD

By ARNOLD B. NEWELL

MERIDEN, Conn.—From time to time during the past twenty years I have stopped to visit friends in the Cuno Engineering Corporation's plant in this busy little industrial city and found developments of real interest and importance to the diesel industry. On this visit I found not one but three new developments and three objectives which combined proved to be as newsworthy as they are interesting. One of these is the development of a patented porous stainless steel filter element in which the porosity may be as low as five microns, or larger as conditions demand. It is called Poro-Klean, type 316. The second development is a cellulose refill cartridge of graduated density down to five microns shaped to fit the shell which carried the fibrous element that has been in use many years. The cellulose is resin impregnated and non-absorbent. The third development is an enlargement of the Super Auto-Klean disc type filter which has been described in DIESEL PROGRESS as a much smaller unit with limited applications. The first of this type had a diameter of 2.25 in. while the new one is 5.7 in. diameter and increased in length to give it 10 times the capacity of the original version.

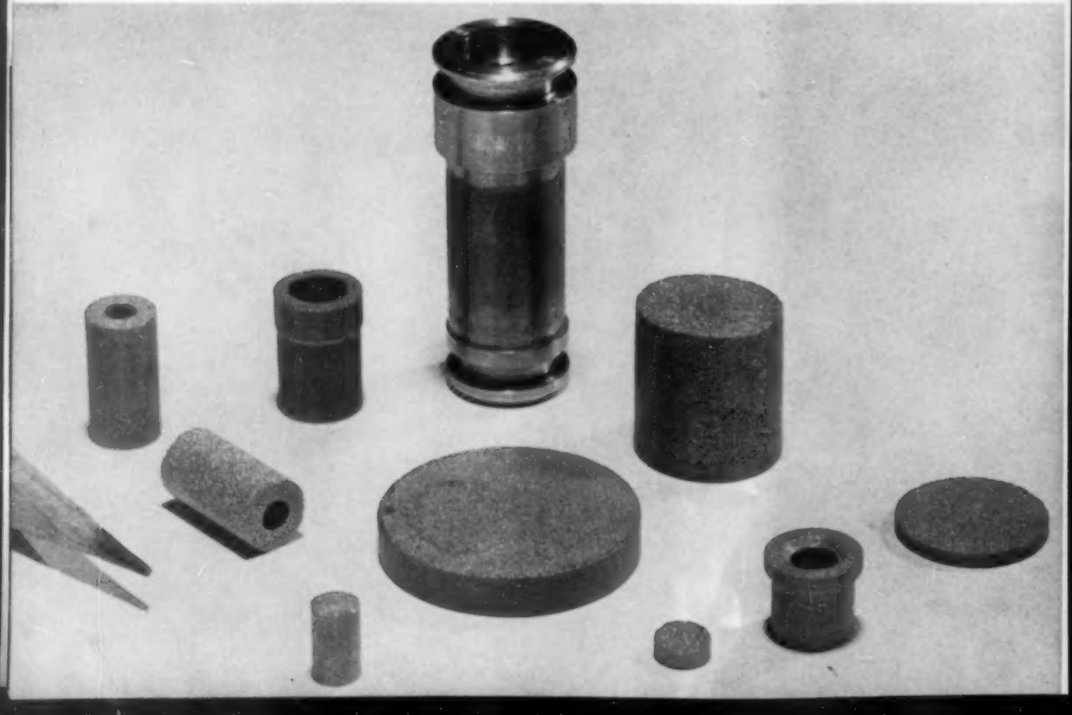
The products and the objectives are definitely related. Objectives are first, the use of porous stainless steel as a protection of the fuel injection nozzles against impurities passed by the preliminary stages of fuel filtration. It is now in such service. Second, to reduce the cost of maintenance of fuel injection pumps and prolong their lives by using the white cellulose filter cartridge as a final stage filter ahead of the pumps. Third, to reduce the load on cartridge type filters in lube oil service and cut down on the frequency and the cost of filter element replacements through using the Super Auto-Klean as a full flow filter in the lubricating system of the engine.

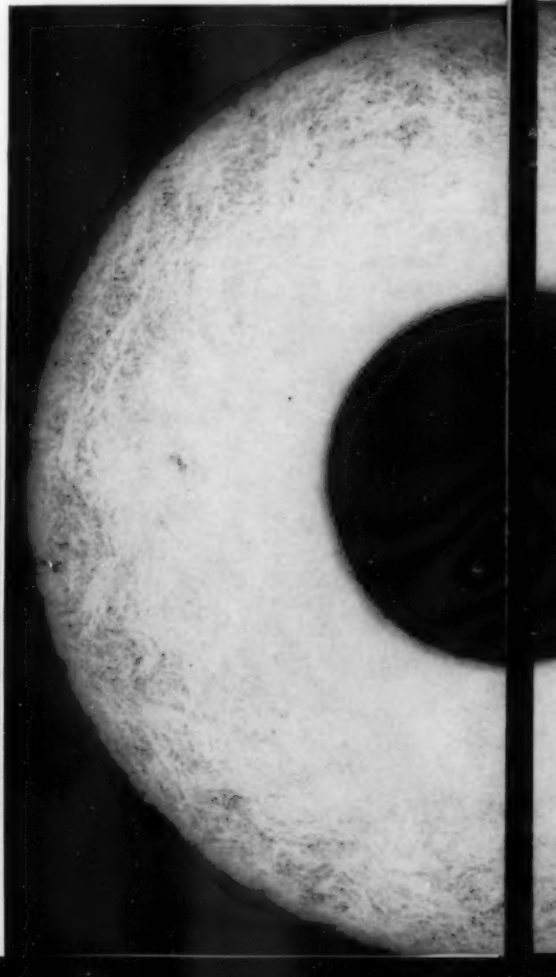
These are all laudable objectives with which we cannot quarrel, but they do not represent all of the uses to which the three products can be put and it is not a part of my job to envision breadth of applications. On the other hand, the full particulars of each one will enable others to decide for themselves what they would like to do with them. Before presenting them, I want to comment on the manufacturer. Cuno Engineering Corporation started filter manufacture as a side line about a quarter of a century ago and filters are now their principal business. One of the early moves was introduction of research which has continued ever since. At one time they farmed out some of their manufacturing work on filters but now they do all of it in their own factories. They introduced the Auto-Klean, self-cleaning edge type filter. Such is the manufacturing background in brief of the units under discussion.

Porosity of the Poro-Klean filtering media results from a network of tortuous paths formed by the metallurgical bonding of adjacent metal particles induced by high temperature in a sintering furnace. The particles size grades are 3, 5, 10 and 20 microns, the tensile strength (ultimate) is 9,000 to 25,000 psi, elongation or ductility is 3 to 6 percent and porosity is 30 to 50 percent. As a filter medium it is non-corrosive and can be cleaned by the back wash method or by dissolving the contaminant in a bath of solvent or with an acid or alkali wash. In short, it is versatile. It has been in industrial services where the temperature ran as high as 1200° F. and is made up in the many different shapes illustrated and in sheets from $\frac{1}{16}$ to $\frac{1}{8}$ in. thick. It can be bent, rolled, welded and machined. The porosity can be reduced in manufacture beyond practical useable limits or increased to the required number of microns. This is an extraordinary kind of filter medium to say the least. Its tensile strength will effectively resist far more than the usual working pressures in all oil filtering processes, and in any event such pressures are usually applied externally. As a filter medium it has practical applications in excess of the number one objective mentioned in connection with fuel injection nozzles. For example, in cylindrical form it works nicely in a conventional housing for cartridge type filters using other media.

The cellulose filter for final stage filtration ahead of the fuel pump is in basic principle like the Cuno fibrous filter. It is of the same shape and graduated density but the porosity at the inside is down to five microns compared to 10 or more microns for the fibrous element. A micron is about 1/250,000 in. With graduated density the tendency to coat is reduced because there is greater capacity for dirt accumulation in the relatively coarse outside area. Further comment on this feature seems unnecessary as Cuno has publicized it extensively in connection with the fibre filter, also resin impregnated and bonded by heat for struc-

Various shapes of the stainless steel porous filter elements as formed in original manufacture. The large cylindrical shape has steel rings welded on at top and bottom. Other forms are made by working up sheets of this porous material.





tural control, strength and prevention of channeling under considerable pressure drop on the fluid being filtered. The cellulose media is of greater tensile strength. Because of the nature of the material, no microscopic particles are released into the oil stream. Since it is non-absorbent there are no dimensional changes in service. It is considered adequate for regular diesel fuel but it would load too rapidly alone in residual service and for that reason the Super Auto-Klean should be placed ahead of it. It works satisfactorily as final stage with any other method of conditioning residuals for use as fuel in diesels.

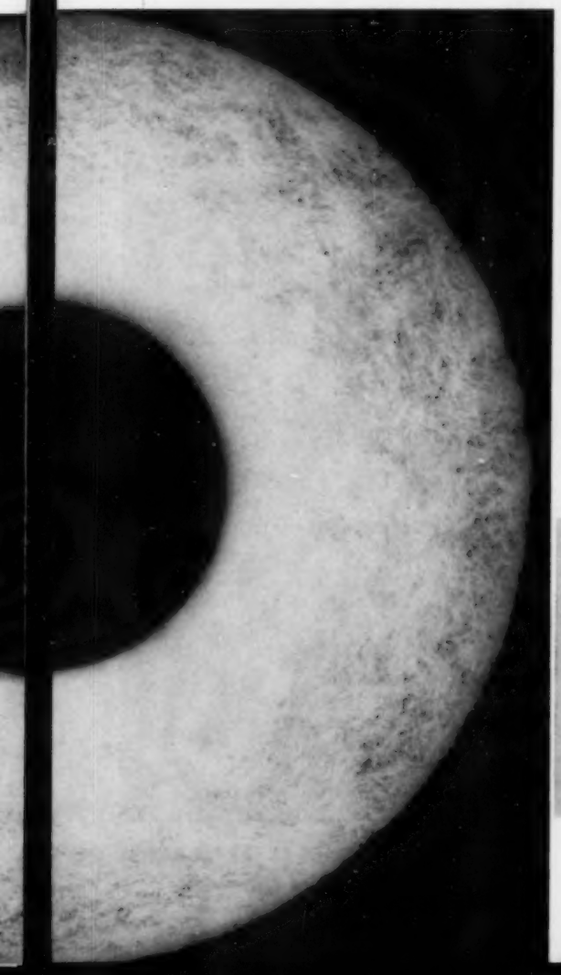
The Super Auto-Klean employs a well-known basic principle with modification. In the original concept metal discs and spacers are assembled on a central spindle with a similar assembly of cleaner blades on a rod, located so that the blades project into the space between each pair of discs. The assembly is inclosed in a metal space with inlet and outlet connections so arranged that the oil enters the annular space between the case and the disc assembly, flows between discs to the space formed by the holes in the discs and out through the discharge connection. The disc assembly can be rotated by means of a handle on the outside of the case, or as with the Super Auto-Klean by an electric motor and reduction gearing for continuous cleaning action in the filter.

Since the cleaning blade assembly is stationary, this rotation causes the blades to scrape the dirt from the discs and drop it to the bottom of the case. In the original conception the degree of fineness of filtration is governed by the practical limitations of thinness of spacers and discs whereas in the new model major and minor discs are employed and similarly assembled on a central spindle without separate spacers. Elements of the major disc are several short projections inward toward the spindle and the degree of fineness of filtration is a combination of the verticle space between discs plus the close proximity of the outer edge of the minor disc to the inner edge of the major disc. And since the cleaner blades project across full width of both discs cleaning function is thorough.

The steel discs are 0.012 in. thick and for that reason particles of more than disc thickness are stopped on the outer surface while particles down to as little as 40 microns are stopped by the second, all metal edge type barrier. After introducing the first series of the new type with an element diameter of 2¼ in. it became necessary in the field to make multiple installations to filter the full volume needed on larger diesels. This was both expensive and cumbersome for the user. With the larger unit of 5.7 in. diameter and ten times the rate of flow of the smaller unit there is considerably less original cost and substantially reduced installation expense.

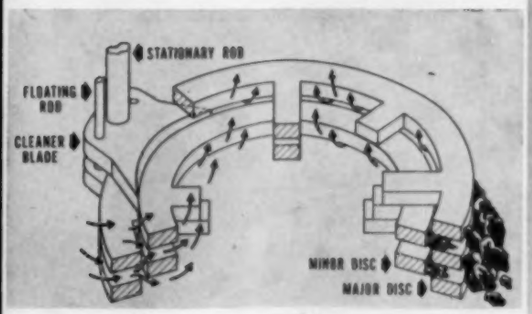
Returning now to the cellulose type of filter element, it is not self-cleaning and where uninterrupted service is required it is supplied as a duplex filter with overlap changeover valve, vent screw, drain plug and left or right side mounting bracket. I should like to point out that in both the porous stainless steel and the cellulose media a degree of filtration fineness has been achieved which cannot always be utilized because of rapid loading in the presence of fluids heavily burdened with impurities. We would not attempt to circulate crankcase lubricants directly thru a 5 micron filter. Such oil would have to be very well cleaned in advance of attempting to give it final stage treatment in any filter of such extremely fine porosity. If the fundamentals in this respect are not known by the user he should request the advice of the filter maker.

Another matter worthy of special mention is the frequency of the presence of water in fuel which when injected into the combustion space in microscopic particles has no apparent detrimental effect on combustion and diesel performance. By placing a final stage filter of extreme fineness in the fuel system minute water globules passing thru the preliminary stages of fuel cleaning are stopped. They will not clog up the element unless water is permitted to accumulate in the filter casing and rise to a point where the filtering medium becomes partly or fully immersed. Adequate provision for water accumulation and drainage at the final stage is essential. While these are matters relating to filter housing design, they are appropriately mentioned because at fairly regular intervals the difficulties with water are brought to my attention and the fact that these new Cuno elements are made of material unaffected by moisture indicates their serviceability in the presence of this troublesome element as well as in oil and fuel.



A cross section of the cellulose filter cartridge, which is snow white when new. Density graduation in depth is shown clearly here.

The arrangement of major and minor discs and route of fluid flow are shown here, as well as an illustration of stoppage first of large particles and then of smaller ones at the edge barrier.



When no interruption of flow is permitted, the cellulose filter elements are carried in duplex housing with an overlapping changeover valve and vent plugs to purge the filter of air.

HERCULEAN TASK AT THE MELT SHOP

By ARNOLD B. NEWELL

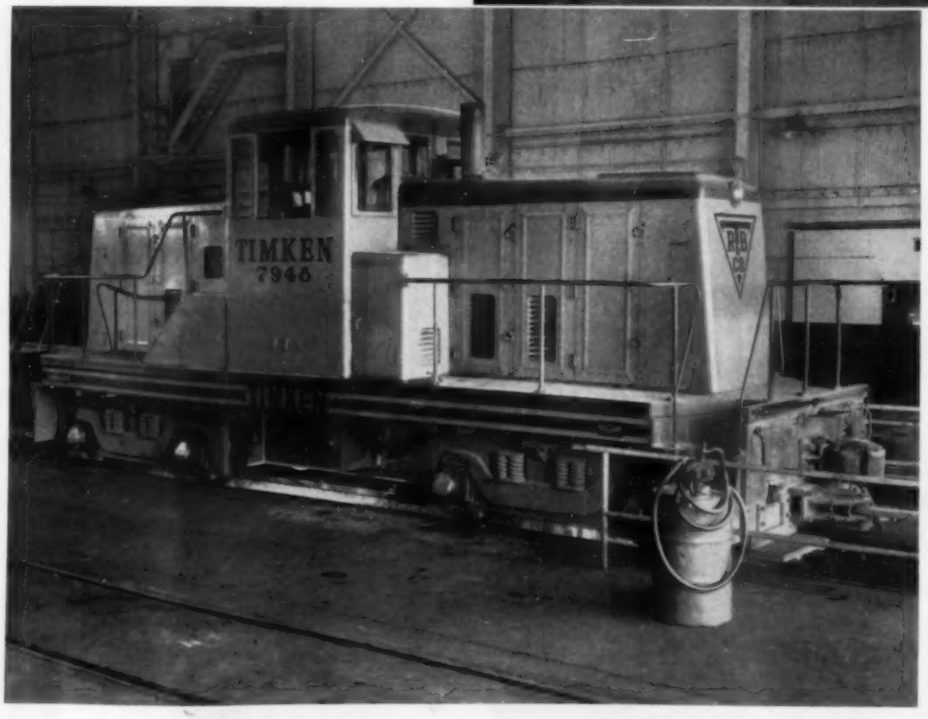
THE electric furnaces in the steel mill at the huge Timken Roller Bearing Company plant in Canton, Ohio have an insatiable maw into which is dumped each day more than 2000 tons of scrap metal and 200 tons of flux. To any one standing on the charging deck in the melt shop it might appear that Dante had been inspired to construct his fictional inferno after having witnessed this operation out of which pours some 2000 tons of electric furnace steel every day of the week—alloy steel of the finest quality to be used in the manufacture of Timken tapered roller bearings, alloy bars, seamless tubing and removable rock bits all bearing the trademark of this famous manufacturer. In connection with this astounding enterprise there is a tale of diesel locomotive operation. To understand what this is all about a few words are needed with reference to the Timken Company occupying 4,112,394 sq ft of floor space in Canton, Gambrinus, Bucyrus, Columbus, Wooster, Zanesville, Mt. Vernon, Zoarville, St. Thomas and Colorado Springs. The Canton plant has 15 miles of standard gauge railroad track, 122 cars and 6 diesel electric locomotives, two of which are of special construction to haul charges to the electric furnaces in the plant.

We will tell about the locomotives after quoting a few more astronomical figures regarding the company which employs some 15,000 people, produces over 127 tons of roller bearings daily, has 1000 tool makers, machinists and tool inspectors to make hand tools, gages and machine parts and to make the repairs necessary in producing the world's biggest bearings. More than a billion complete tapered roller bearings have been produced by this company. The diamonds required to keep the grinding wheels true in this plant are worth over $50,000. and the wheels themselves cost $750,000. annually. Wells within the plant supply 7,000,000 gallons of water daily and the electric power consumed would furnish light and power for a city of 300,000 inhabitants. Such is a glimpse of The Timken Roller Bearing Company.

It might seem at first glance that half a dozen diesel locomotives are small potatoes in an operation of this magnitude, but two of these are essential elements, for the steel mill would stop if both locomotives should be taken out of service for any reason such as repairs. The other four yard locomotives could not pinch hit for the ones working at the melt shop because the latter have sides cut away for work in the close quarters and the regular yarders cannot pass in. The switchers working within the Canton and Gambrinus plants are a pair of 100 ton Alcos and a pair of 70 ton General Electrics with Cooper-Bessemer engines in them. As there is nothing unusual about their operation we shall leave them to perform their appointed tasks in their own efficient way. The two working at the melt shop are also General Electric locomotives and one is a 65 tonner with two Hercules diesels while the other is an 80 ton job with a pair of 6-cylinder Hercules TCD diesels.

To get the story and what is behind it I went out to the Gambrinus plant and had a talk with the locomotive and car foreman, Charles Beaver, who has been twenty years in steam locomotive work, but has gained experience with diesels dating back sixteen years and in addition he has attended the Alco school in Schenectady. He is aided by Roy Winkhart who spent his life with steam until he got mixed up with diesels, which are more to his liking. These men say they have never yet encountered a diesel problem they could not lick, and to this end the Timken Company provides them with a good shop and ample maintenance equipment as well as the essential spare parts.

Only one of the special locomotives working at the melt shop is needed at a time. When I asked what would happen if both should fail I was given



making the condition inside the engines very good. I asked how often the engines are fully serviced. The answer is every thirty days with a check made daily. How long between overhauls. Well, the 80 tonner ran 14,600 hours after which the Timken bearing equipped Hercules diesels were taken down to the crankshaft and completely rebuilt making it good for another 14,000 or 15,000 hours of hard work such as hauling those strings of moulds weighing 200 tons. The job was done at the Gambrinus shop which is well equipped even to the point of having locomotive jacks to lift whatever may need lifting.

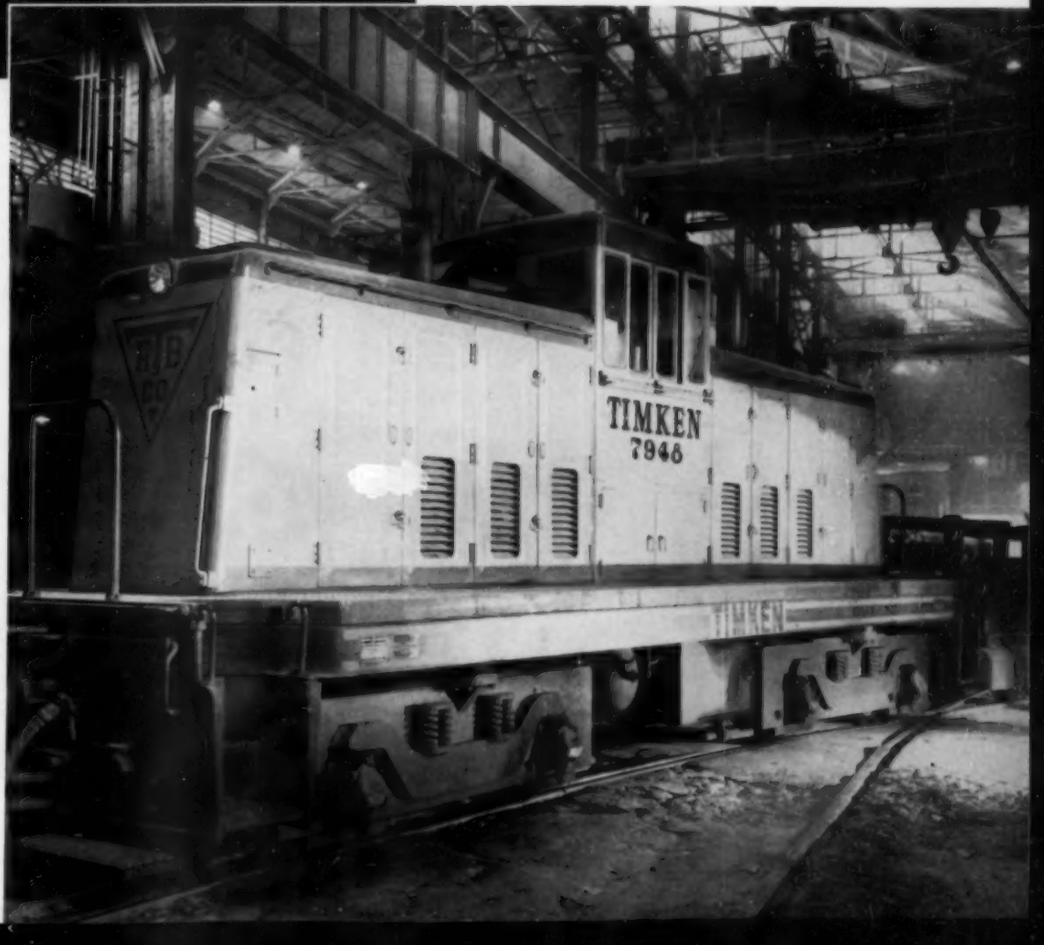
How long have the diesels been running? Well, they started in March 1953 and they now top 25,000 hours. When you say it quick, 14,000 hours may not seem like much but it is over 583 days, 24 hours per day. And when Charles Beaver explains how he keeps 'em rolling it does not seem much of a job for this self-assured railroad locomotive and car foreman who has never encountered a diesel problem he couldn't lick. So far as he knows the heat in the melt shop makes little difference to the diesels and the General Electric electrical equipment. But if you stand to one side and watch the operation you would probably muse as I did, it is a Herculean task well done in a place where they can't fail! The 6-cylinder Hercules TCD is a 4-cycle turbocharged engine, having a cylinder bore of 5⅝ in. and 6 in. stroke with a normal rating of 304 hp at 2000 rpm.

An indication of the weight per load moved by 7948 is the load of ingots moving out of the melt shop at the ground level. Two Hercules turbocharged 304 hp diesels provide her with plenty of power to do this job.

After being fully serviced 7948 moves out of the railroad shop ready to go into action at the melt shop.

a straight answer that it can't happen. If one is down for overhauling, the other must keep on running night and day everyday because you simply cannot stop feeding the melt shop. None the less there is a condition to which the best kind of diesels might object. The air is hot and to some extent smoky which brings us to another reason for preferring diesels. In the old days the open hearth furnaces of the time were served by steam locomotives lacking the power and efficiency of the diesels. Their smoke made it difficult for the men to work in the melt shop and the diesels improved this situation.

To deliver some 2200 tons daily, of scrap and flux, alloys, limestone and a little coke and coal requires 90 to 100 trips daily to the melt shop. And that is the job of this pair of symbols of perpetual motion. Out at the maintenance shop at Gambrinus we learned how this is done. One answer is filters—oil, fuel and air are filtered completely,



DIESELS HELP BUILD TEST HIGHWAY

A FOUR lane test highway now being built in Northern Illinois may save American taxpayers millions of dollars in future highway construction costs. Located in farm lands between Ottawa and LaSalle, Illinois, the highway is a project of the American Association of State Highway Officials. Through the association, highway officials of the 48 states and other interested agencies will profit by the most comprehensive study of materials, equipment and processes ever undertaken in road-building history.

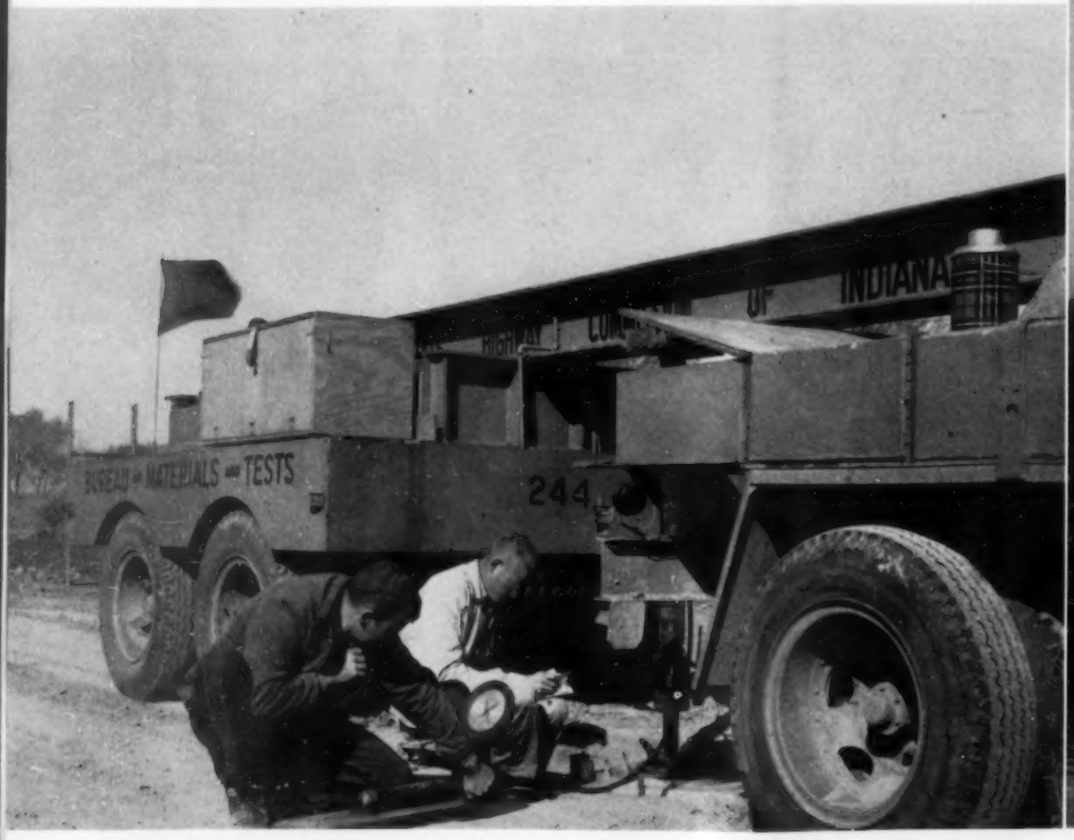
Construction started on August 1, 1956 with S. J. Groves and Sons Company of Minneapolis and the Arcole Midwest Construction Company of Skokie, Illinois teaming up for the construction of the road bed. It will be surfaced this Spring, half with rigid portland cement concrete and half with flexible bituminous concrete laid in varying thicknesses to determine what thickness of each will serve to best advantage. When completed, the highway will endure practically a lifetime of use in a comparatively short period of time. Controlled traffic, ranging from vehicles of 2000 lbs per single-axle load up to 48,000 lbs per tandem-axle load will travel the highway 16 hours per day. The effect of this traffic will be checked by the greatest array of electronic equipment ever assembled for such a purpose. The entire project is being carried out for the association by the Highway Research Board of the National Academy of Sciences at a total expenditure of $14,000,000.

By November, 1956 the contractors had moved and compacted approximately 1,000,000 cu yds of clay to complete the highway's sub-grade structure. Obtained from three pits in the vicinity, the raw clay was laid over the highway route by a fleet of dieselized high-speed scraper and hauling units. Preparation of the road bed—once one of the most neglected phases of highway construction—received maximum attention on this project. Trav-L-Plant mixing units manufactured by the Seaman-Andwall Corporation of Milwaukee provided efficient in-place mixing and had excellent facilities for accurate moisture control needed for a research project of this type. Thirty of these units—all GM Detroit diesel driven—were put to work on this job.

The Trav-L-Plants with their many-tined rotors and spray facilities travelled over the road bed breaking up clods, adding moisture and blending all particles into a smooth mixture. They operated usually in series at a speed of approximately 75 ft per min. each processing a seven ft swath. When the Trav-L-Plants finished their work a fleet of

Clay from three borrow pits in the area were found to meet engineers' requirements for the sub-grade fill. Here S. J. Groves and Sons Company, loading in one of the borrow pits, was using a Euclid scraper and twin-engine TC-12 tractor pusher—both powered by GM Detroit Diesel engines.

Engineers here are spot-checking the uniformity of the road bed compaction. By means of scientific test equipment they exert pressures equal to or greater than heavy highway vehicles to determine the degree of "give" in the already compacted fill.

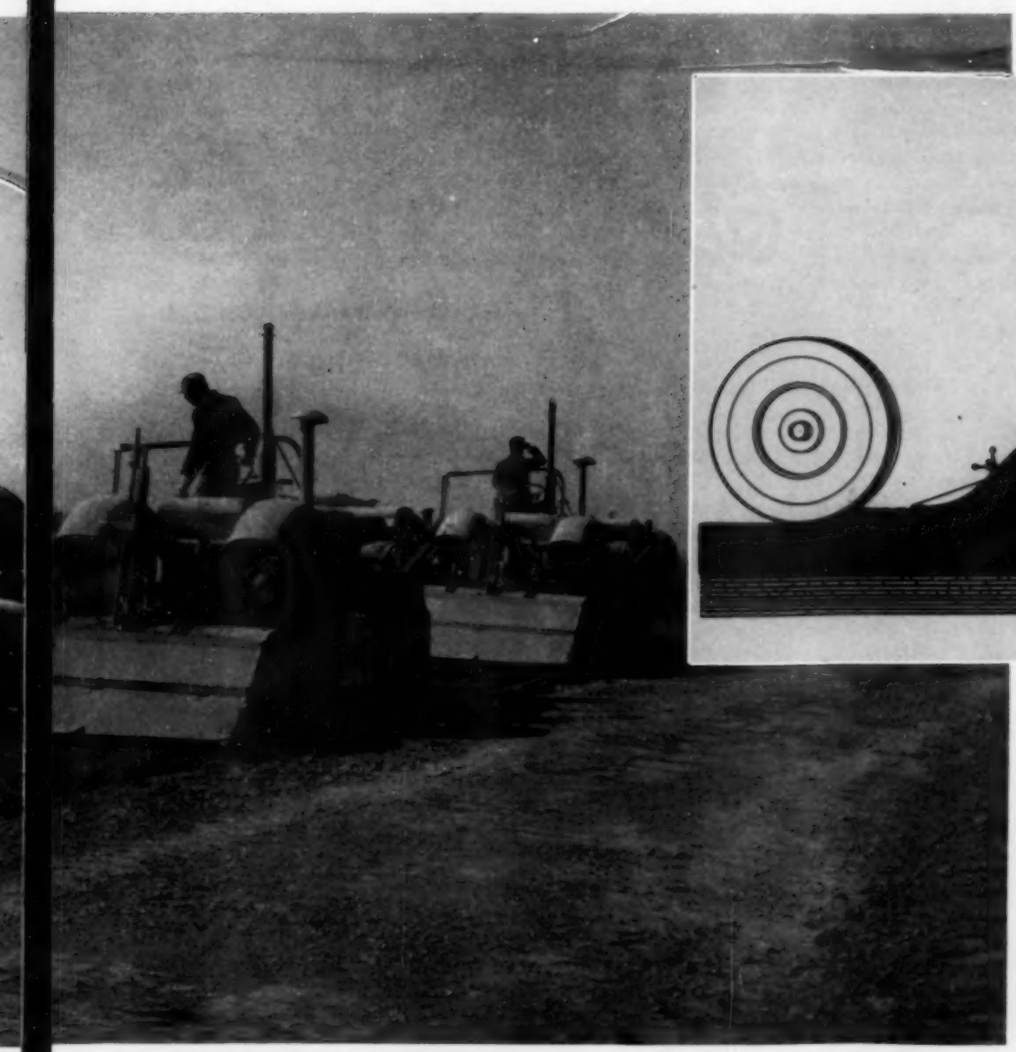


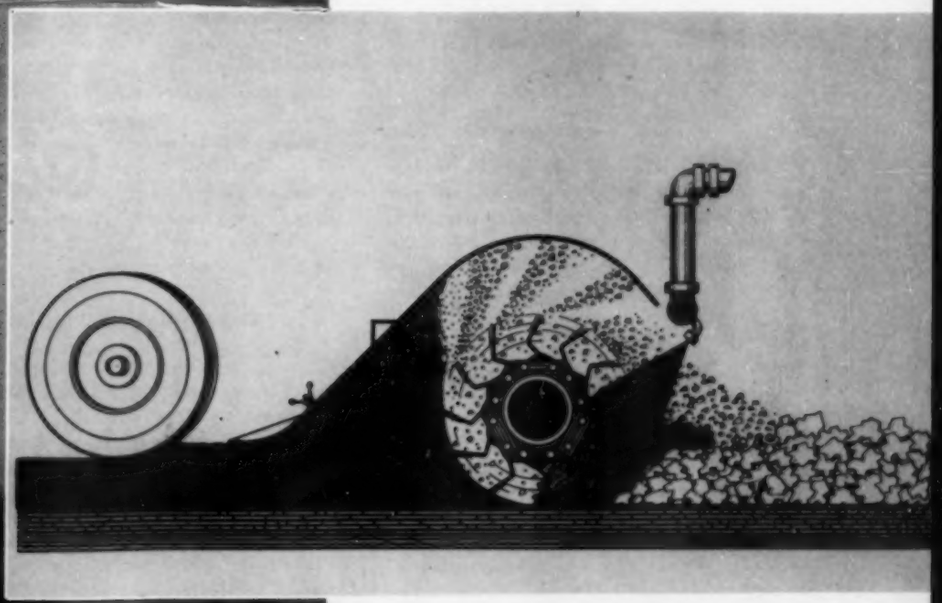
Seaman-Andwall Trav-L-Plants move over the raw clay sub-structure breaking up clods, adding moisture and blending all particles into a smooth road bed mixture. An engineer follows the units to check fill moisture content. Thirty of these vehicles—all powered with GM Detroit Diesels were used by the two contractors.

pneumatic compactors were towed over the fill by diesel tractors. The road bed was built up to a thickness of approximately 36 inches with layer upon layer of clay laid and compacted separately. Careful control of materials, equipment and processes from borrow pit to finished compaction was necessary to assure absolute uniformity of the road bed. Specifications called for fill densities ranging from 95 to 100 per cent of standard maximum with only a two per cent variation from optimum moisture content.

Also, it was determined that self-propelled vehicles supplying water to the Trav-L-Plants disturbed the uniformity pattern. Water tanks, therefore, had to be mounted on uniformly-designed, rubber-tired trailers to be towed by the mixing units. Equipment working on any one section of the highway had to be matched with identical units in equal numbers on every other section. These instances illustrate the precautions taken to preclude roadbed variations which might later influence test data on surface durability. They also illustrate the thoroughness with which the highway research board is carrying out this extensive test project for the association.

Coming on the eve of one of the greatest road-building programs ever attempted the studies should have a profound effect on the thousands of miles of highway construction now in the plan-





Sketch shows the addition of moisture and the "in-place" mixing of the sub-grade structure accomplished by the Seaman-Andwall Trav-L-Plants and compaction of the blended fill by pneumatic-tired compactors.

ning stage. Undoubtedly the project will result in better highway construction leading to longer life and the saving of millions of dollars in future construction and maintenance costs. The highway will also pay off in a more conventional manner. Sometime after 1960, when it has served its original purpose, it will be opened to public travel as a nine-mile section of U. S. Highway #6.

EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY **ARNOLD B. NEWELL**

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspoor diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

Diesel Freighters

Here-to-fore we have looked upon freighters as ships with large holds into which miscellaneous classes of general cargo are slowly and laboriously loaded and stowed at the port of departure, and at the port of destination this same procedure is carried out in reverse. Under the American Flag they are chiefly steamships and in other countries mostly motor vessels. As to whether this type of ship will eventually become obsolete as the tramp steamer did remains to be seen. Various efforts have been made to cut down the high cost of time in port and cargo handling in the conventional manner and at the same time reduce the cost of moving it on land to its final destination.

The trailer ship was given quite a bit of attention for a time but its popularity is waning and now the idea of using standard packages of cargo to fit the ship's stowage facilities as well as freight cars and highway trailers is being stressed with a view of eliminating the bulk and weight of the trailer. This introduces the diesel engine as the most desirable kind of propulsion. To that end we have a project in development by Transportation Utilities utilizing twin screw propulsion with a pair of diesels of 4000 hp total in two vessels for operation on the Atlantic Coast. This method of freight movement is under study by the International Standards Organization, the International Container Bureau and the International Cargo Handling Coordination Association. Naval architects are giving it increasing attention. In his general study of the impact of the St. Lawrence Seaway opening Mr. H. C. Downer, a prominent naval architect of Cleveland, Ohio, introduces the subjects of container cargo vessels and diesel engine drives for Great Lakes-Seaway routes.

Before the war Tom Bowes of Philadelphia, another naval architect of prominence, designed what was known during the war as the Bowes type ship to carry standard units of cargo for the Scott Paper Company. Many of these vessels were built and used in different parts of the world. The propulsion was with diesels and the cargo handling was with a diesel operated crane on a gantry spanning the long cargo hold and wide hatches. For various services other carriers have been built for palleted cargo and standard packages. To evaluate the diesel for packaged cargo ships we shall not again be thinking in terms of adapting diesel engines to vessels built around steam power as we did in the past. Ship type and power to be used will be decided simultaneously.

Fuel economy becomes an important yet secondary consideration. Convenience of machinery arrangement such as utilization of the tapering space far aft where standard cargo packages can not be carried and the compact installation achievable with production line diesels of the kind built for locomotives, the freedom from bulky stacks which could interfere with fore and aft movement of new forms of cargo handling equipment over loading ramps must all be taken into account. In this field of development of shipping it is apparent that the utilitarian qualities of the modern diesel are likely to be deciding factors in its favor just as they were largely responsible for the development of the modern river towboat.

The Mechanical Lubricator

Old timers remember when even the smallest gasoline engines were equipped with mechanical lubricators and a multiplicity of copper tubes leading to every working part of the engine, especially the cylinders, the main bearings and the banjo oil rings on the cranks. But as time passed these remarkable mechanisms which carried the fresh oil supply and measured it out drop-by-drop were replaced by splash and then pressure systems of lubrication, but bigger engines were built requiring even more precise control of the lubricants delivered to critical areas, especially the cylinders of diesel engines. Progressive improvement in mechanical lubricators kept pace with the greater responsibilities placed upon them. The oil drop was split into fractions and delivered at the precise time it was needed on the cylinder wall and there were no mechanical failures of the device which would run year after year without needing any repairs. One by one the makers of mechanical lubricators for use on diesels and other large internal combustion engines turned their attention to other fields as pressure lubrication was made to serve all purposes in totally inclosed engines. And yet there has always been the demand for and need of mechanical lubricators on big engines and to meet this demand the Manzel is still available in forms and models far superior to the earlier ones that were essential to proper engine lubrication.

I would not care to return to wick and hand oiling nor ring oilers on main bearings nor banjo rings on the cranks. But in the matter of cylinder lubrication, I still have a warm spot in my heart for the dependable devices which always assured a precisely measured feed of clean fresh oil to the cylinders where only the cleanest and the best oil is good enough to assure proper lubrication. Perhaps there are data on cylinder wear and piston ring freedom in the grooves to prove that I am wrong, but I believe that fresh oil on the cylinders in the precise quantity needed as metered and delivered by the mechanical lubricator should be favored in engines of design suitable for this system.

Self Propelled Railroad Car Float

Construction of a self propelled car ferry 375 ft long, 59 ft beam and 16 ft depth for operation on San Francisco Bay is in sharp contrast to practice on the Eastern seaboard, particularly New York Harbor. From the machinery installation viewpoint it is of interest because the ferry will be propelled by three 700 hp Enterprise diesels and have a 200 hp Murray & Tregurtha Harbormaster at the bow giving side thrust for quick maneuverability. The speed is to be 10 knots carrying 26 to 28 freight cars. It will replace two barges and two tugs operating between the Oakland mole and San Francisco thus cutting the operating personnel about 50 per cent. Economy of the operation compared to the existing equipment should appeal strongly to the Western Pacific Railroad Company who contracted for the building of the vessel, Las Plumas at the Albina plant in Portland, Oregon.

What the designers, L. C. Norgaard & Associates and the Western Pacific Railroad Company are doing may prove to be a solution to problems of freight car movement to distant points such as Albany or New Haven for the Las Plumas is obviously capable of successful navigation under adverse conditions of weather on broader stretches of water than the essentially confined harbor spaces around New York City.

DIESELS ON APACHE HAUL RECORD LOADS OF PONDEROSA PINE

Two 1,000-Hp. Fairbanks-Morse Locomotives Help Southwest Lumber Mills Move 75 Million Feet Of Logs Up 3% Grades; Save 780,000 Gallons Of Fuel Oil On 600 Round Trips A Year.

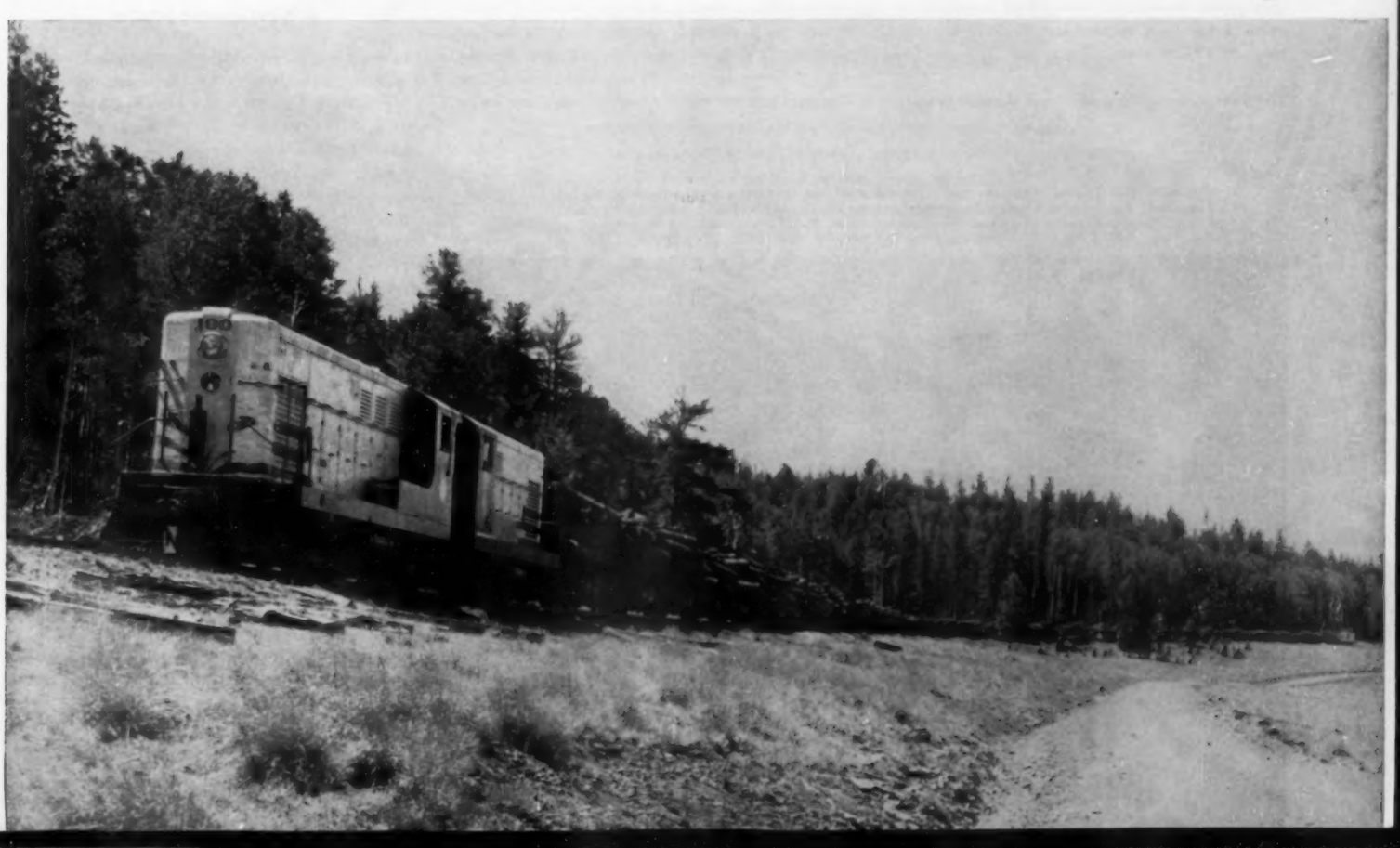
HIGH in Arizona's famed Apache Land, a pair of Fairbanks-Morse diesel locomotives is helping one of the nation's largest producers of Ponderosa Pine move up to 75 million feet of logs annually. A subsidiary of Southwest Lumber Mills, Inc., the Apache Railway runs a twisting, turning 68 miles through sleepy meadows and then up steep grades into Arizona's high country. Replacing steam locomotives, the diesels make more than 600 round trips a year and are saving more than 780,000 gallons of fuel.

The largest installation of the lumber company is the McNary mill, deep in the heart of the Fort Apache Indian Reservation, and primary logging sites are at Maverick. To haul logs to the mill, the colorful railway uses two 125-ton Fairbanks-Morse diesels, each rated at 1,000 horsepower for the tortuous run. Operating conditions are difficult. The road climbs to an altitude of 9,430 feet above sea level where the rarefied atmosphere causes power units to lose part of their normal pulling capacity. Grades are steep, ranging up to 3 percent. Loads are heavy, with the two diesels expected to haul trains of 50 loaded flat cars totaling 2,500 tons. Hauling goes on around the clock with maintenance time held to a minimum.

According to Mr. S. E. Mounes, executive vice president of the Apache Railway Co., the two diesels, working together, make the 68-mile trip with 50 loaded 50-ton flat cars in just 5 hours. Including turn-around time at both ends of the run, the round-trip averages 12 hours and the engines make two such trips a day six days a week. Often they work the seventh day too. This 24-hour service schedule adds up to more than 600 round trips a year. Continuity of service is essential. "If logs don't reach the mill on schedule," Mr. Mounes points out, "it means everyone is out of business in a lumber operation." To assure the uninterrupted flow of logs, the railroad keeps its diesels in top condition without interfering with the demanding timetable. After each round trip, the diesels receive preventive maintenance servicing and inspection which consumes only one half hour. Just once a year they are taken into the shop for complete servicing. Making allowance for all maintenance time and for idle Sundays, the diesels are actually at work 86 percent of the time and are available for work more than 93 percent of the time.

This schedule has been in effect ever since the two F-M locomotives were introduced to Apache Land in 1947 and 1948 and the diesels have made more than 5,000 round trips with undiminished efficiency and without increase in maintenance time. Prior to the acquisition of the diesel-electric locomotives, the job was handled by steam engines which consumed 2,000 gallons of fuel oil on a round trip. The opposed-piston diesels use only 350 gallons per unit or 700 gallons for the pair. With the diesels rolling up 600 trips a year, this means a saving of 780,000 gallons of fuel a year or more than 7,000,000 gallons in the years the diesels have been on the job.

Close coordination of railroad and mill is necessary to the huge logging operation in this rugged country. To effect this control, the locomotive cabs are equipped with two-way short-wave radio making it possible for the lumber mill or railway headquarters to issue special instructions to the train at any time during a run. With a total of 140 miles of road, the Apache is the longest short-line railway in Arizona. The road operates as a common carrier from McNary north to Holbrook where it joins the Santa Fe and as a contract carrier for Southwest Lumber on the McNary-Maverick leg. It is on this latter section that the tireless diesels are hauling Ponderosa Pine.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

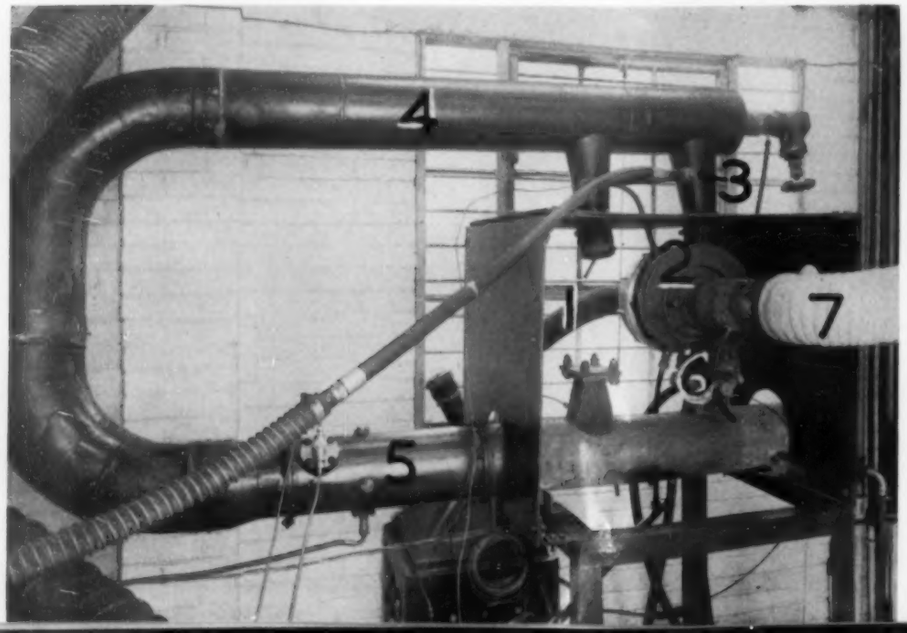
British Turbochargers for Automotive Engines

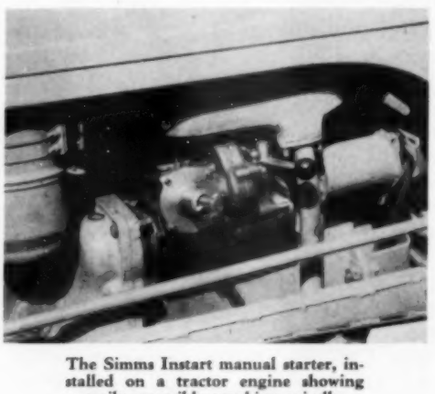
During the past few weeks there have been two important announcements by British firms which could have a very far reaching influence on diesel engine development in the immediate future. The companies concerned are the country's largest suppliers of fuel injection and electrical auxiliaries, C.A.V. Ltd. and Simms Motor Units Ltd. Simms Motor Units have acquired an exclusive license to produce and sell, in the United Kingdom and throughout the sterling area, the small turbocharger designed and developed by Geratebeau Eberspacher at Esslingen in Germany. Initial production is already under way at Simms' Finchley works and a number of British diesel engine manufacturers are known to be interested in the new product. It will be recalled that the new Meadows engines, described in December make use of the Eberspacher blower and other British engines to which it has been applied include Perkins, Dorman and Thorneycroft.

The Simms Eberspacher blower is a comparatively simple design utilizing a radial turbine rotor and compressor impeller, both units being overhung with a bearing support between. The blower can be operated independently from the engine so far as lubrication and cooling are concerned and it can therefore be fitted in any desired position on a vehicle. The unit can be supplied either as a completely water-cooled design or completely air-cooled or partially air and partially water-cooled, and it has the following principal technical details: maximum operating speed 38,000 rpm; maximum permissible gas inlet temperature 1,256 deg. F.; weight 37½ lbs; length 9 1/16 in. and diameter 11 in.

Coincident with the Simms announcement C.A.V. Ltd., of Acton, who have been known for some time to have been actively developing a small turbocharger design, issued preliminary details of the stage reached in their development work. After investigating a number of design projects they embarked on a practical research program dealing particularly with materials, blade design, bearing life and lubrication and they state that a promising design is now undergoing tests. A special test house has been built at Acton devoted specifically to turbocharger development.

C.A.V. experimental turbocharger on endurance test operating as a self-sustaining gas turbine. 1.—Inlet to blower. 2.—turbocharger. 3.—Blower outlet. 4.—Main ring trunking. 5.—Combustion chamber. 6.—Turbine inlet. 7.—Turbine exhaust to atmosphere.





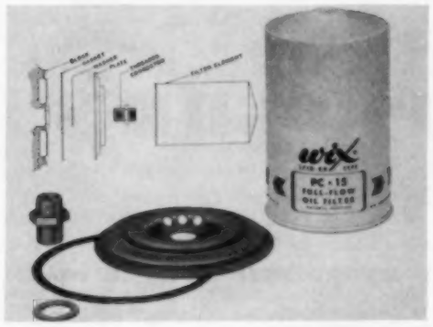
The Simms Instart manual starter, installed on a tractor engine showing easily accessible cranking spindle.

A New Inertia Starter

In addition to their recently announced interest in small turbochargers for diesel engines Simms Motor Units Ltd., have also introduced a compact hand starter for automotive type diesel engines. I saw this new unit demonstrated recently when a Ford diesel engine was started in approximately seven seconds by a young woman who had never previously seen the unit. The starter is known as the Simms Instart and it makes use of inertia forces stored in a rotating mass. It can be fitted conveniently in place of a standard electric starter without any alteration to the engine and it turns the engine by means of a pinion engaging with the flywheel gear ring in the same manner as an electric starter.

When the cranking handle is turned the starter pinion moves gradually into engagement with the flywheel so that during the cranking period the engine is slowly rotated through auxiliary gears in the starter. This helps to free the engine and primes the fuel injection system. When the rotating mass of the starter has reached the appropriate speed a warning bell sounds in the starter and the operator then moves over a small lever to engage the inertia mass with the pinion through reduction gearing and thus turns the engine sharply. When the engine fires the pinion disengages automatically from the engine flywheel.

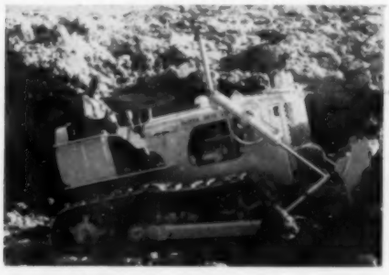
New Oil Filter Development



Wix Corporation has announced a new Spin-on Type Oil Filter. This new and improved PC-15 Full-Flow Filter is designed for twist-of-the-wrist hand installation without the need of any tools.

The Wix Spin-on is a self-contained filter. Filter housing, cover, cover bolt, loose gaskets, and oil lines have all been eliminated for added simplicity in this new filter development. A built-in relief valve, being part of the filter, avoids the problem of sludge and dirt-clogged permanent valves. A positive, leak-proof seal is assured with a built-in gasket. Messy changing has been overcome with the Spin-on filter by a special spring-loaded valve that retains the sludge and old oil, preventing drain-back. Other extra features include a light-weight, aluminum body with an exclusive grip-paint top for easiest hand installation and removal. It is emphasized by the manufacturer, Wix Corporation, Gastonia, N.C., that this new Spin-on Filter provides maximum flow rates and high microscopic particle retention. Supplemental to the Spin-on Filter is a Wix Conversion with a special Adapter to make this new Filter easily and quickly suitable as replacement equipment on many trucks now on the road. (ITS NEW)

Hercules Powers Tractor

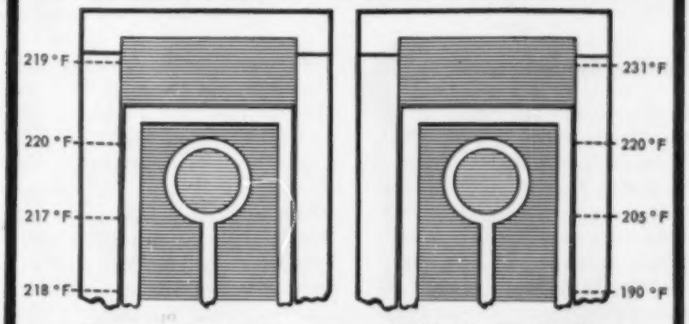


This Oliver OC-12 crawler tractor is powered with a Hercules DJXC diesel with a 3¾ in. bore and 4½ in. stroke and a 298 cu in. displacement. This engine develops 83 hp, and is typical of the diesels that Hercules exhibited at the ARBA Road Show. This is a good illustration of the use of smaller diesels in roadbuilding equipment.

While it is a fact that the oil will somehow get by a dirty filter and lubricate the engine after a fashion, that is not the way it was intended to be when the oil filter was installed. An engine fairly well lubricated is like a fairly fresh egg for breakfast.

test proves . . .

ENGINE EQUIPPED WITH VAPOR PHASE *maintains* UNIFORM OPERATING TEMPERATURE



Cylinder of engine cooled by Vapor Phase. Note temperature uniformity at all 4 thermocouple readings.

Cylinder of engine cooled by conventional means. Note temperature variation of 41°F.

The above temperature readings were made from thermocouples sealed in the cylinder metal at the points shown. The results graphically show the temperature uniformity throughout the cylinder length of the VAPOR PHASED engine, while the conventional cooling system ranged from 190°F. to 231°F.

WHAT DOES THIS MEAN TO YOUR ENGINE OPERATION?

The VAPOR PHASE system provides a trouble-free internal combustion engine cooling system that keeps the engine, or battery of engines, at a constant, uniform operating temperature at all times, regardless of engine speed or load.

This constant temperature control, as shown by installation after installation, improves combustion, minimizes cylinder wear and reduces lube oil sludging. It is, in fact, the "lowest cost" system in every way—in first cost, operating cost and maintenance cost.

WANT MORE INFORMATION? We'd like to tell about the many other advantages of VAPOR PHASING. For profitable facts write and tell us about your installation.

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GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

ASME Gas Turbine Conference & Exhibit

The second annual conference and exhibit will be held by the Gas Turbine Power Division of the ASME at the Sheraton Cadillac Hotel in Detroit the week of March 18th. The following is a tentative program which shows a well rounded schedule. Monday, March 18, 1957: Registration and exhibit open 4 p.m. Tuesday, March 19, 1957—a.m.: Chairman—T. J. Putz, Manager, Gas Turbine Engineering, Westinghouse Electric Corporation. Vice-Chairman—D. N. Frey, Associate Director, Scientific Laboratory, Ford Motor Company. *Gas Turbines in the Chemical Industry*, Z. S. Stys, Head, Mechanical Division, Brown Boveri Corporation. *Influence of Working Fluid Characteristics on the Design of the Closed Cycle Gas Turbine*, S. T. Robinson, Vice-President, American Turbine Corporation. *Design Requirements for Marine Gas Turbines.* Tuesday, March 19, 1957—p.m.: Chairman—O. E. Rodgers, Chief Engineer, Utica-Bend Corporation. Vice-Chairman—G. J. Huebner, Executive Engineer—Research, Chrysler Corporation. *Design of a 16,500 kw Gas Turbine*, A. O. White, Supervisor, Central Station and Large Industrial Application Design Unit, Gas Turbine Department, General Electric Company. *A New Single Shaft 3000 hp Gas Turbine Ideal for Mechanical Drive Application*, J. Yindra, Westinghouse Electric Corporation. Tuesday, March 19th, 1957—Evening. Chairman—B. G. A. Skrotzki, Engineering and Management Editor, *Power* magazine. Vice-Chairman—G. H. Howell, Professor, Mechanical Engineering, Wayne State University. *Development of Gas Turbines for Road Vehicles*, A. Carelli, Gas Turbine Engineer, Fiat, Italy. *The Austin Vehicle Gas Turbine*, Dr. J. H. Weaving, Austin Motor Company, England.

Wednesday, March 20, 1957—a.m. Chairman—P. R. Sidler, President, Brown Boveri Corporation. Vice Chairman—L. L. Otto, Professor, Mechanical Engineering, Michigan State University. *Determination of Turbine Stage Performance for an Automotive Power Plant. Analytical Methods for Performance Estimates of Free Piston Gasifiers.* Thursday, March 21, 1957—a.m. Chairman—B. O. Buckland, Consultant, Gas Turbine Department, General Electric Company. Vice-Chairman—J. J. Uicker, Chairman, Mechanical Engineering Department, University of Detroit. *Designing Thermocouples for Response Rate.* R. J. Moffat, Gas Turbine Department, Research Staff, General Motors Corporation. *A Generalized Presentation of Gas Turbine Combustor Performance.* A. E. Noreen and W. T. Martin, Applied Research Operation, Flight Propulsion Laboratory Department, General Electric Company. Thursday, March 21, 1957—p.m. Chairman—E. P. Vincent, Professor of Mechanical Engineering, University of Michigan. Vice-Chairman—W. A. Turunen, Head, Gas Turbine Department, Research Staff, General Motors Corporation. *Gas Turbine Generating Experience of West Texas Utilities Company*, A. R. Cox, Mechanical Engineer, West Texas Utilities Company. *Gas Turbine Maintenance in Severe Service*, R. C. Hill, Engineer, Turbine Locomotive Design, Union Pacific Railroad Company.

A few comments with regards to this program should be of interest. Mr. Stys' paper will be of unusual interest opening up an entirely new field in gas turbines as furnished to the chemical industry. There are considerable possibilities in this field which not only include the open cycle gas turbine but certain types of the closed-cycle gas turbine. Even though Mr. Stys is with Brown Boveri he points out that many units have already been installed in this country. In fact according to the paper ten units are now in operation in the United States with others to follow. Mr. S. T. Robinson's paper is another excellent contribution to the closed-cycle gas turbine art which includes nuclear power. It is fine to note two papers from across the water on automotive equipment, one from Italy and one from England. Both automotive companies have done a great deal of development work. It was of particular interest to note in Mr. Hill's paper that the main difficulties with the Union Pacific Gas Turbine Locomotives are no longer with them, but they are still having such things as electrical ignition failures. A complete report giving the highlights of the meeting will be furnished in the May and June issues.

SAE Annual Meeting

The Small Turbine session on January 16th had over 400 attending showing its popularity. Typical was the report of Wallace E. Skidmore, of Boeing Airplane Co. He said that in 10 years a turbine designed and built by his company has increased in output to 240 hp from 120, but grown in weight to 320 from 220 lbs. When he showed the film of the Creole Petroleum Company's 40 ft speed launch in action with two Boeing Turbines (each 240 hp selling for $7,500.00) I heard the following remarks from a man standing near me. "That's an expensive power plant just for a boat." Then a few seconds later this man changed his tune saying "Wow—what a performance." This man found out like many others are learning—if you want performance a gas turbine will produce it. Mr. Skidmore's paper was not limited to any field and showed actual engines operating successfully in practically every field from prop aircraft units to several hundred on Navy boats.

Mr. Gordon Sorenson of Continental Aviation and Engineering Corp. showed some excellent slides on stress analysis, not only of the turbine wheel and blades but also their experience with centrifugal air compressor construction and testing. It was pointed out that considerable work of this nature is required on any turbine and they have thoroughly covered this in their J-69 engine.

Messrs. Norman C. Witbeck and Reece V. Hensley of Turbomotor Division, Curtiss Wright Corp., discussed small turbine application to aircraft and concluded by saying "—for typical missions in the high subsonic or supersonic speed range the small, lightweight turbojet engine package generally requires a lower weight of engine plus fuel than either an unaugmented or augmented single large engine of equal thrust."

"How small is small, applied to turbines?," asked D. P. Edkins and M. H. Thorson, of General Electric Co. They proposed that a small turbine be one having a primary airflow rate of not more than 75 lbs of air per second at sea level static conditions. On this basis, they explained, a small turbine can produce 4,500 to 5,000 lbs of thrust as a turbojet, 7,500 to 8,000 equivalent hp as a turboprop. Need for small turbines is created by the growing number of small aircraft, missiles, helicopters and target drones, they commented, as well as by the broadening desire to halt the increasing size and complexity of military installations.

Dr. Anselm Franz, of Lycoming Division, Avco Manufacturing Corp., pointed out that production costs of small turbines are relatively high. He

recommended that they be designed for versatility so as to satisfy a wide variety of applications. Dr. Franz expressed the opinion that the small turbine is suited for use in small airplanes, helicopters, vehicles, boats and stationary power production. He gave a good description of their T53-L-1 having a military rating of 825 hp.

"The satisfactory small turbine must be built from the idea up and not just be scaled down from a larger size," the meeting was advised by Sumner Alpert, of Solar Aircraft Co. He described development by his company of the 50 hp Mars and the 500 hp Jupiter turbines which have given very satisfactory service, with troubles confined largely to accessories. "Many current and potential applications exist where the small gas turbine can compete with other forms of powerplants," he said. "There are definite areas where the characteristics of the small gas turbine make it the preferred powerplant. The growing number of firms in the small gas turbine field attest to a widespread belief in its promise of profitable production. The problems can be summarized into two major areas: First, simplify the controls and accessories. Second, reduce costs."

Chairman of Board

Foster N. Perry

The election of Foster N. Perry as Chairman of the Board of Directors of the Robert Bosch Corporation, the American subsidiary of Robert Bosch GmbH, Stuttgart, Germany, was announced recently in New York after a meeting of the Corporation's directors. Mr. Perry, who continues at the same time as Special Representative of the parent company, had previously been associated with the American Bosch Corporation, Springfield, Massachusetts for 32 years, the last five as Executive Vice President. Robert Bosch GmbH, whose products have been sold in the United States since 1906, is one of the world's large manufacturers of automotive electronic, household and industrial equipment, with distribution, sales and/or service centers in 112 countries.

Assistant Sales Manager

Ralph G. Greer

Ralph G. Greer has been appointed assistant sales manager of the Construction Equipment Division of International Harvester Company, succeeding C. E. Jones, who has been named supervisor of national contractors' sales, Harald T. Reishus, vice president of the division, announced here. Mr. Greer joined International Harvester at its Minot, N. D., district office in 1933. He held several positions in sales until 1940, when he was appointed assistant district manager at Mason City, Iowa, and later served in that same capacity at Quincy, Ill., and Salt Lake City, Utah. From 1942 to 1946, Mr. Greer served in the U. S. Navy. In 1946 he was appointed assistant regional manager of motor truck sales, eastern region. He later was transferred in the same capacity to the company's central region and in 1948 was appointed regional manager of motor truck sales for Harvester's western region.

In 1951, Mr. Greer was made manager of the company's Detroit military products office and served in that position until 1953, when he was returned to the motor truck division as regional manager for the east-central region. In October 1954, Mr. Greer was appointed manager of Harvester's Washington, D. C., office and has served in that capacity until the present time. He will be succeeded in the Washington office by Thomas E. Aughinbaugh, former central regional manager, motor truck sales, who also will have jurisdiction over the Detroit military products office. Mr. Jones, in his new position, will concentrate his efforts on the large users of construction equipment. He will work closely with the construction equipment division's entire sales organization as well as with the company's distributor organization.

It is all the troubles that were encountered with diesels in the past that taught us the art of diagnosis and technique of corrective measures. Fortunately for the engine of today ways and means were found to overcome all operational problems except the one closest to the heart of the man who revels in his troubles.

C.A.V.

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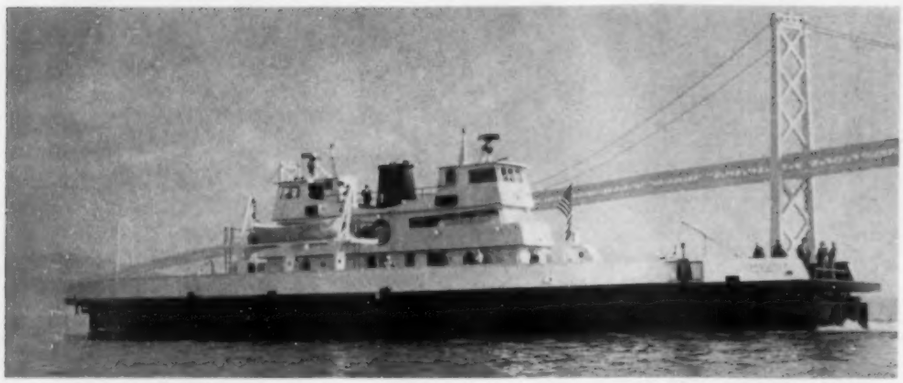
San Francisco Ferry



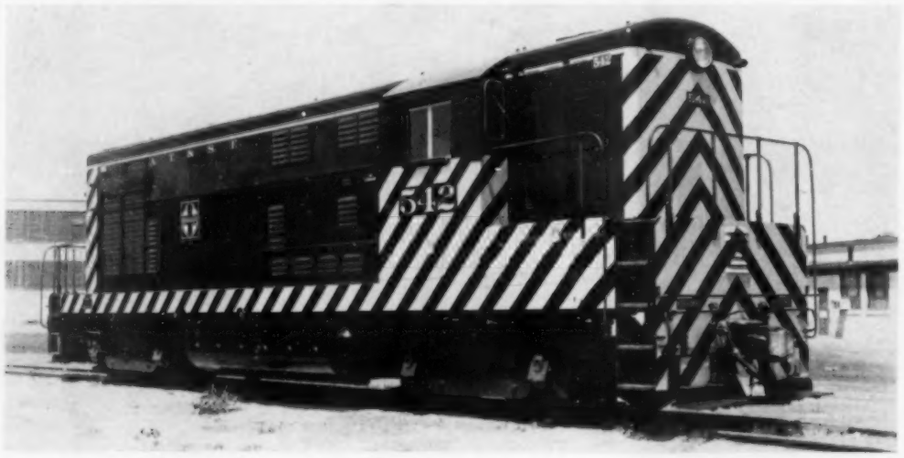
The steel diesel ferry *Carquinez*, first ferry vessel to be built for service on San Francisco Bay waters since 1927, was placed in service on the Martinez-Benicia run across the Strait of Carquinez November 12, 1956. This strait connects the Sacramento River with San Francisco Bay. The new vessel, 190 ft in length, 52 ft beam, 14 ft in depth and with a draft of 8 ft 6 in., is powered with a 1,000 hp Union diesel engine and, though designed for maximum speed of 11 knots, in her trials exceeded that figure by .6 knot, averaged over runs with and against the tide on the standard course in San Francisco Bay. Her exceptional maneuverability was indicated by the fact that she was taken from full speed ahead to full astern in only 32 seconds.

The *Carquinez* has a capacity of 40 automobiles and 50 passengers. However, she has actually carried as many as 46 autos and her crew believe that when they become better acquainted with the available space, they may be able to load two or three more on her. The vehicles are carried on an open deck, which overhangs the hull by eight ft on each side, giving her a beam over sponsons of 68 ft. Passengers are carried in a narrow island structure over the machinery space. Fore and after wheel-houses are on top of this central island structure. *Carquinez* was built by the Pacific Coast Engineering Company, Alameda, California. She is being operated by the Division of Highways of the State of California because the Martinez-Benicia route is a link in State Highway 21, an important connection between San Jose and intermediate regions with routes leading to state capital at Sacramento and to the Sacramento Valley.

Carquinez has several features unusual in a ferry. Her two propellers are direct-connected to her engine and run at the same speed—normally 485 rpm—at all times, the engine being reversed to change direction. The engine can be started, stopped or throttled from either of the two wheelhouses by means of Westinghouse Air Brake Company pneumatic controls. *Carquinez* has a Sperry-Rand electric-hydraulic steering gear by which the steersman can control either the forward or after rudder by using the appropriate one of two levers on the control box or by means of the conventional wheel. When steering by the wheel, an indicator shows the rudder angle as the member moves. When steering with the levers, the steersman moves the lever until the rudder indicator shows the angle desired to be attained and the gear automatically moves the rudder to that point. Propellers on the new vessel are bronze, 67 in. in diameter, with 34 in. pitch. They were made by The Doran Company.

The Union engine is of eight cylinders, 12 in. bore and 15 in. stroke, with rated horsepower developed at 485 rpm. The cooling system is fresh water, with each cylinder enclosed in a thin metal skin to contain the coolant. Pistons are cooled by a circulating oil system. Valve gear is enclosed—a departure in Union engines—and is pressure lubricated, as are all the bearings in the engine. Union pivoted segmental type thrust bearings are located at each end of the engine, one for each propeller. Circulation for the fresh water cooling system is provided by a reversible gear pump driven from the flywheel end of the main propulsion engine.

New Locomotive Model



A new Fairbanks-Morse locomotive model has been put in service by the Santa Fe Railway. This new 1200 hp unit combines the high train heating and fuel capacities of the road switcher with the lower first cost and operating economies of the yard switcher. The Santa Fe is using them in terminal service to move assembled trains from coach yard to station, while providing an ample source of heating and cooling (Santa Fe uses steam injector air conditioning in summer.) Each unit is 55 ft 4 in. long, 10 ft. 6 in. wide, 14 ft 6 in. high, and weighs 246,000 lbs, all on drivers. The locomotive is constructed on the standard Fairbanks-Morse Model H16-44 road switcher underframe, except that switcher type friction draft gear and switchmen's footboards are used, and the pilot is omitted. Tanks for 1200 gallons of fuel oil and 1200 gallons of water are arranged beneath the underframe between the trucks.

Mounted on this underframe is the standard F-M switcher 1200 hp opposed-piston diesel engine, accessories, engine hood, and cab. To this is added a short hood structure, or doghouse, of sufficient size to accommodate a 4500 lb/hr capacity steam generator. The cab structure and equipment arrangement identical with those used on the standard F-M switcher modified slightly to permit cab entry on both sides as on a road switcher. Externally, the unit closely resembles many F-M road switchers now in service.

All rotating electrical equipment is manufactured by Fairbanks-Morse, including an extra 7.5 kw auxiliary generator provided to furnish power for the steam generator. Control and switchgear are General Electric. 6SL air brake equipment is provided. In terminal service, switcher type trucks with plain bearings are used, but for higher speed road switcher work, standard roller bearing equipped swing bolster trucks can be applied as a modification. ITS NEW

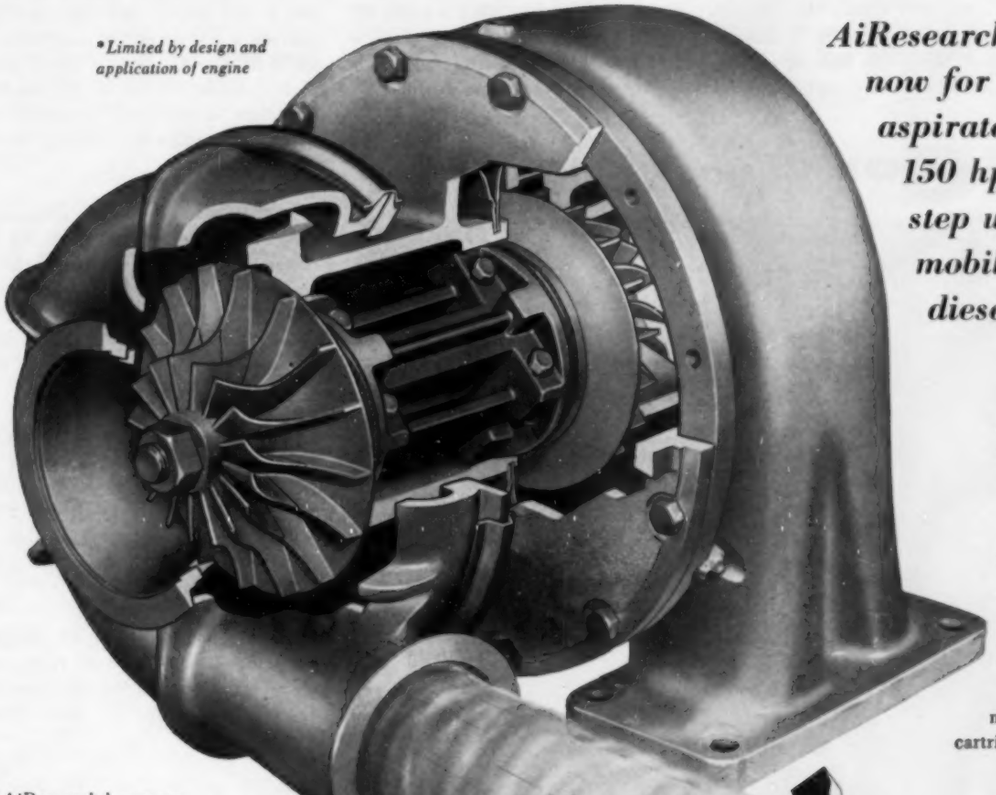
Marine Sales Representative

E. C. Schum

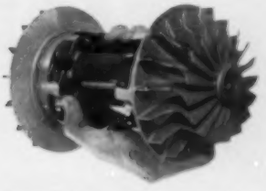
Mr. William Barnes, Vice President of The C. Lee Cook Company, Louisville, Kentucky, manufacturers of Piston Rings and Metallic Packings, has announced the appointment of E. C. Schum as Marine Sales Representative for the Ohio River Valley from Huntington, West Virginia to Cairo, Illinois. Mr. Schum was formerly Diesel Engine Sales Manager of The Baldwin-Lima-Hamilton Corp. (Hamilton Division). He is a graduate of Cornell University.

AiResearch Turbochargers improve diesel engine performance up to 100%*

**Limited by design and application of engine*



AiResearch units are available now for use with normally aspirated diesel engines of 150 hp and up. They step up performance of both mobile and stationary diesels, land or marine.



Removable cartridge simplifies repair and overhaul

This cartridge contains the turbocharger's rotating assembly, bearings and seals in a factory balanced package. It can be replaced in minutes with another factory balanced cartridge by a mechanic on the scene.

AiResearch has more experience in the design and manufacture of small turbomachinery than any other company in the world. This experience has led to refinements in AiResearch turbochargers which make them the most efficient and safest units of their kind. New additions to the AiResearch family of turbochargers have widened their range of application in the diesel engine industry.

Our engineers will welcome the opportunity to work with you in improving the performance of your diesel engines. We are happy to confer on possible application of the turbocharger principle to your power plants.

AIRESEARCH TURBOCHARGERS NOW AVAILABLE				
MODEL	T-10	T-15	T-16	T-30
Diameter — in. nom.	9	15¼	11½	15¼
Length — in.	9	16¾	15¾	17¼
Weight — lb.	39	125	100	135
Output — lb/min. (Standard Conditions)	25-40	35-65	45-65	70-95

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

Gulf Coast Diesel Notes

By **Michael T. Pate**

KIRK Satters, New Iberia, Louisiana, who is drilling superintendent for the Circle Drilling Company in that area, has bought from Waukesha Sales & Service, Inc., of Houston, a matched pair of model 6WAKDBSM Waukesha diesels, rated at 315 hp at 1800 rpm, which will drive his new boat through a pair of Capitol reducing and reversing gears.

TODD Shipyard Corporation, Galveston, Texas, has secured from Mustang Tractor & Equipment Company, Houston, a model D13000 Caterpillar diesel, rated at 151 hp, which will be used to repower one of the corporation's Orton 25 cranes in the Galveston shipyard.

PIONEER Centrifuging, Limited, Houston, has bought from Waukesha Sales & Service, Inc., of Houston, a model 195 DLCU Waukesha diesel rated 81 hp at 2200 rpm. The diesel will power one of the company's de-sanding machines.

LOUISIANA Transportation Company, Houston, will power a new 45 ft steel tug with a series 71, model 6061A, General Motors diesel, driving through a 3.75:1 General Motors hydraulic reduction and reversing gear. The company's new 55 ft steel tug will be powered with a series 110, model 62206, 6-cylinder General Motors diesel with a gear similar to that in the smaller tug. Both diesels were furnished by Stewart & Stevenson Services, Inc., Houston.

STEEL Tank Construction Company, Houston, has purchased from Big 3 Welding Equipment Company, Houston, sixteen 300-amp Lincoln welding generators, each powered by a series 71, model 2055, 2-cylinder General Motors diesel. The units will be used in the company's field operations.

KATY Drilling Company, Katy, Texas, has secured from Waukesha Sales & Service, Inc., Houston, a model 16WA KDBSU Waukesha diesel, rated 305 hp at 1600 rpm which will be used to power a pump designed to test water wells for power requirements.

CITY of Sonora, Texas, has bought from the Diesel Division, Fairbanks, Morse & Company, a 6-cylinder, model 38D8-⅛ spark-ignited gas engine rated at 960 hp.

BAROID Sales Division of The National Lead Company, Houston, will drive two centrifuges with as many Waukesha model 190DLCU Waukesha diesels, rated 71 hp at 2200 rpm. The engines were supplied by Waukesha Sales & Service, Inc. of Houston.

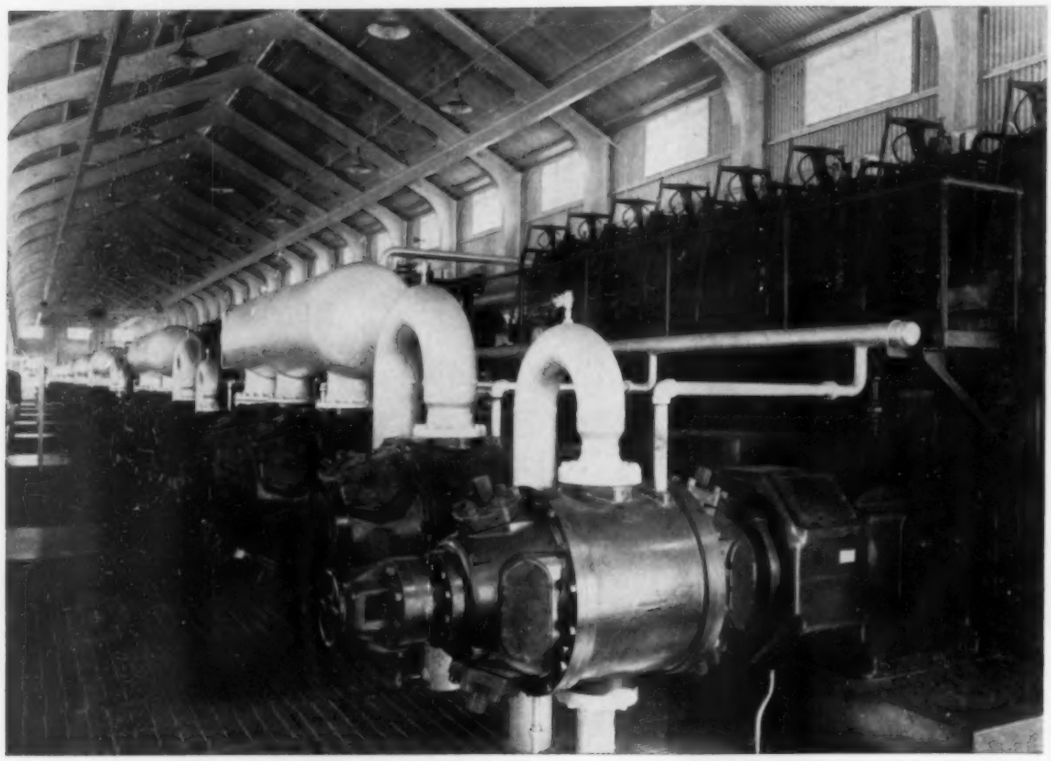
ATLANTIC, Gulf & Pacific Company, Houston, has bought from Big 3 Welding Equipment Company, of Houston, two 300-amp Lincoln welding generators, each powered by a series 71, model 2055, 2-cylinder General Motors diesel.

LOUISIANA Supply Company, Shreveport, Louisiana, has secured from Waukesha Sales & Service, Inc., Houston, a model 148DKBU Waukesha diesel rated 174 hp at 1800 rpm.

Railroad Representative

The Air-Maze Corporation announces the appointment of William A. Powers as Railroad Representative. In this capacity, Mr. Powers will assist in the Company's direct coverage of the railroad industry from the Air-Maze Chicago office at 6459 North Sheridan Road. Formerly with The Precision Engineering Company, Mr. Powers will handle the application and sale of air and liquid filters for use on locomotives and passenger car bodies.

Look to COOK for Better Rings!



Cook packing and rings help keep compressors humming!

A well-known oil-producing company keeps this big lineup of Clark Bros. compressors running night and day in a West Texas gasoline plant. Keeps them running smoothly and efficiently, too — *thanks in good measure to C. Lee Cook packing and piston rings!*

Whatever type industrial equipment you operate, if it uses piston rings and packing, chances are good that it was Cook-equipped *when it was built.* That's why your best bet for continued trouble-free performance is to *keep it Cook-equipped.*

Your nearby C. Lee Cook representative will be glad to give you all the facts about precision-engineered Cook products. Why not talk with him soon? C. Lee Cook Company, 940 South 8th Street, Louisville 3, Kentucky.

C. LEE COOK COMPANY

A Subsidiary of Dover Corporation

Rings and Packings Since 1888

Inland River Reports

By **A. D. Burroughs**

WHILE in this neck of the woods, we saw the six-month old *Shark*, towboat built by Calcasieu Shipbuilding Corp., for Coastal Towing Company of New Orleans. Owners are enthusiastic about this vessel's performance with Illinois waterway ice this season, with 1110 hp from Allis-Chalmers supercharged engines.

A SPECIAL thanks to a friend for the picture of the towboat *Weatherwood*, which was enclosed in a holiday greeting. This vessel owned by U. S. Gypsum Co, was using its 800 hp from Atlas Imperial engines to deliver a sled and reindeer for Santa's performance at Greenville, Miss. No foolin'.

CONGRATULATIONS to Socony Mobil Oil Company, Inc., for the award from the National Safety Council to Socony's inland fleet. Port engineer Chris Gloede; port Captain T. Fender; Gen. mgr. of marine transporation P. S. Wise, and marine superintendent of the inland fleet, S. B. Parsell were on hand for the presentation.

ALSO, the mailman brought the picture of the *Willie Mayo*, a part of the Mechling fleet, with the 1400 hp coming from two JS-6 Cooper-Bessemer engines, and one GN-6 Cooper-Bessemer.

THE *Thomas C. L. Nugent*, new towboat named for the head of Nugent Sand Company, Louisville, was recently completed at the Tell City (Ind.) division of Maxon Construction Co. Measuring 86 x 24 x 8 ft, power comes from two D397 Caterpillar engines, rated at 500 hp each. Two Cat D311 generators provide generating power.

CONSIDERABLE favorable comment has been heard along waterways regarding the new crewboat, the *Clara B.* Measuring 35 x 12 ft, built by Roy Breaux' Marine Service, Loreauville, La., power comes from a twin pair of GM engines, Model 4071-A. Owned by Daniel Buras, Boothville, La., this crewboat is modern in every respect, is keel-cooled, equipped with Allison hydraulic reduction gear.

Replacement Cartridge Program

The Briggs Filtration Company, Washington 16, D.C., recently announced a new expanded line of replacement cartridges are now available to include full coverage of off-the-road equipment and small marine requirements, as well as the truck, bus and passenger car field. This expanded coverage features products designed to meet original equipment specifications.

The broadened scope of the Briggs replacement cartridge program was made possible by the recent addition of the new super-flow, pleated paper line. This cartridge is designed for full-flow engine lubricating and fuel oil applications, and other uses requiring extremely high flows, and does not remove additives found in many petroleum products. A new replacement cartridge chart is now available, along with a comprehensive original equipment replacement reference section showing the application of Briggs cartridges for nearly a thousand different makes of passenger cars, trucks, buses, off-the-road equipment, small marine engines and power units.

(ITS NEW)

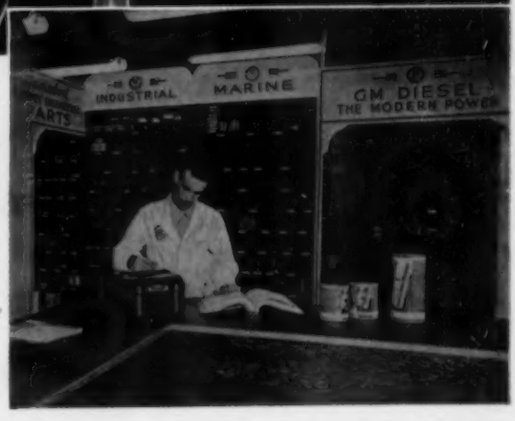
NOW AVAILABLE! The Completely new Volume 21 of **DIESEL ENGINE CATALOG.** This giant, fully illustrated reference book containing complete and detailed engine and accessory sections is bigger, better than ever before. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Orders are being accepted for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company order forms to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, California.

GM DETROIT DIESEL PARTS

...factory-engineered for long life, low-cost service

CYLINDER LINER QUALITY CONTROL

In checking the metal's hardness for wear resistance, diameter dimensions are measured electrically as well as mechanically to insure perfect fit and interchangeability. Even the smoothness of the ground liner surface is recorded by this "on-the-production-line" inspection.



MODERN PARTS DEPOTS ALWAYS NEARBY

GM Detroit Diesel Distributors and Dealers from coast to coast carry complete stocks of factory-engineered GM Detroit Diesel parts. They're as near as your telephone—ready "round the clock" to keep your engines working and earning for you.

You're always money ahead when you buy factory-engineered parts from your Distributor or Dealer

GM GENERAL MOTORS DIESEL POWER

DETROIT DIESEL

Engine Division of General Motors

Detroit 28, Michigan

Single Engines... 30 to 300 H.P. Multiple Units... Up to 888 H.P.

America's Largest Builder of Diesel Engines

Florida Diesel News

By Ed Dennis

TWO 10 kw Kato standby generating sets powered with model GD 157 Continental diesels—these 4 cyl 3⅜ x 4⅜ diesels are rated 39 hp at 2000 rpm, radiator cooled and automatic starting upon power failure—for the Florida Turnpike Authority at their Palma Sola and Cortez Toll Plazas. N. J. Mc Nair of Coral Gables was the manufacturer's representative.

POWERED with Cummins diesel engines, the sister trawlers, *Harry G.* and *Mildred Ann* are the 55 ft Hatteras type shrimpers. The model H R M 600 Cummins are rated 165 hp at 1800 rpm and turn a 42x36 three blade Federal propeller through 4:1 r&r gears.

NORDBERG Manufacturing Co. announces that their distributors for their Power Chief diesel sets are Diesel Marine Engineers in Jacksonville while at Tampa it is the C. V. Mims Marine Ways that looks after their wants.

SHELLEY Tractor & Equipment Co. of Miami, will supply and install a model D397 Caterpillar diesel generating set at the new terminal being built at Miami International Airport. This turbocharged diesel installation includes the new 350 kw 480 volt Caterpillar generator.

DADE Drydock Co. is building the *Inagua Rover #2*. #1, a prototype, proved so successful as a combination landing craft, freighter and liquid carrier, that the West India Shipping Co. ordered a second vessel built. It will be powered with two D375 Caterpillar diesels rated 300 hp each at 1000 rpm through Snow Nabstedt 3:1 r&r gears plus two D311, 19 kva generating sets, Quincy air compressors and Ross heat exchangers.

RECENTLY launched by Diesel Engine Sales at St. Augustine and powered with a General Motors diesel was the *Miss Sunbury* of Key West with a 6-71 and 4.5:1 Allison r&r gears and the 67 footer with a 6-110 that Mike Lanasa of Key West will take delivery of soon.

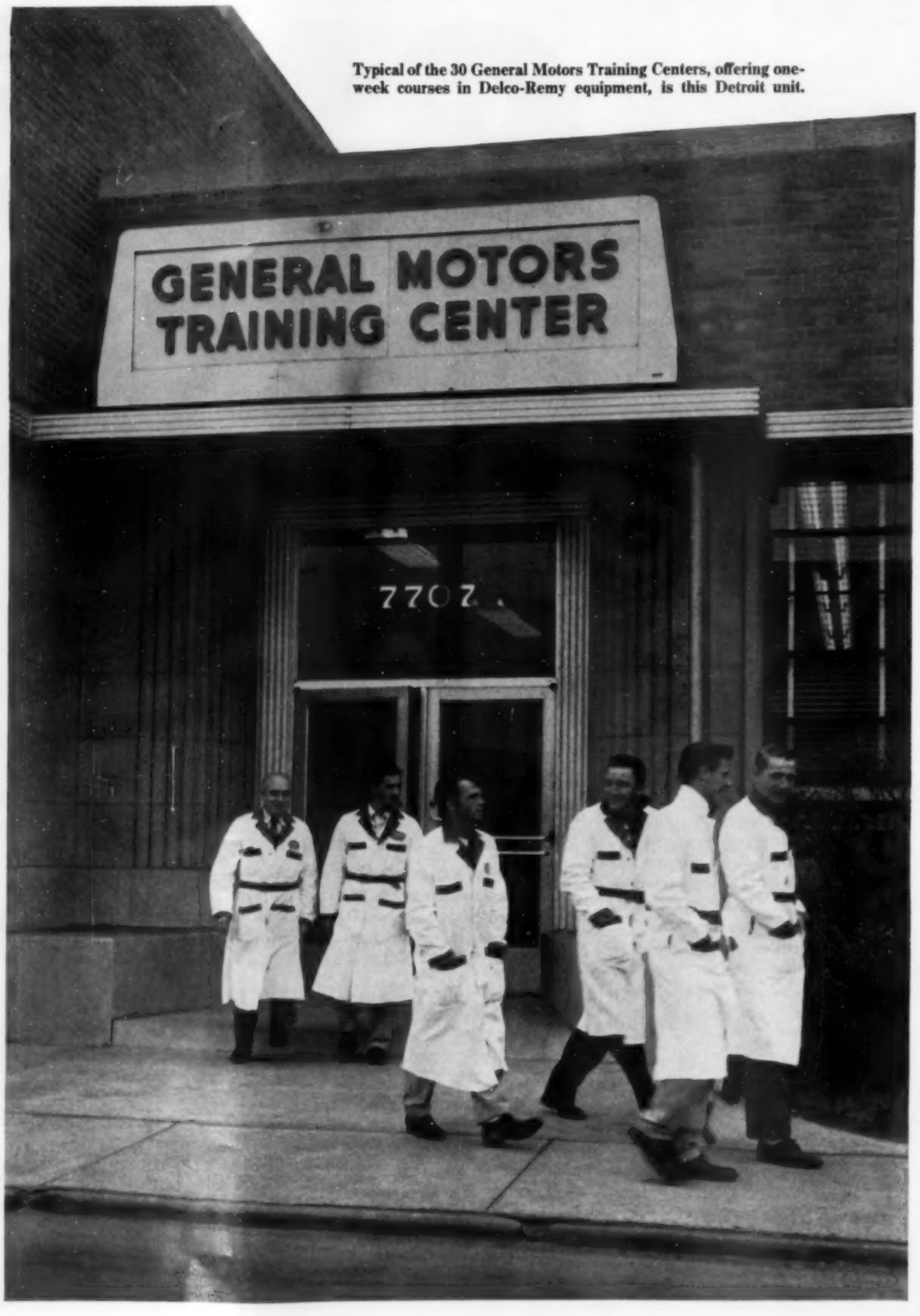
FOR highway use, the International Harvester Truck Co. in Jacksonville—3 model JT6B Cummins diesels rated 175 hp in IH hi-way tractors plus a similar installation for the Joe Ross Trucking Co. in the same city.

THE Minneapolis-Moline Florida diesel engine distributors are, Joe Priest Inc. of Tavares, Boogers Service & Equipment Co. in Lake Wales, Machinery & Supply Co. in Jacksonville, and on the West Coast it is Chapman Machinery Co. of Tampa.

A 200 kw Katolight diesel generating set was installed at the sewerage treatment plant at St. Petersburg. Powered with a model NKDBSU Waukesha turbocharged diesel, it is equipped with an exerciser timer for checking operation of the plant at regular intervals. N. J. Mc Nair of Coral Gables was the manufacturer's representative.

DIESEL Shipbuilding Co. of Atlantic Beach, Fla. launched the 56 ft tug *Gatco Carolina* for the Gulf Atlantic Towing Co. It is powered with a tandem twin General Motors 6-110 diesel rated 440 hp plus a 3 kw 32 volt Onan diesel generating set.

THE Service Machinery Corp. of North Miami, recently delivered, to the Airport Rockfill Co., one of their 28 ft portable Dixie Dredges powered with a model 6DAMR-844 Buda diesel rated 215 hp at 2000 rpm and SR12A Cotta transmission to drive an 8 in. Maddox sand pump. The Buda diesel was supplied by the J. Frank Knorr Co. of Miami.



Typical of the 30 General Motors Training Centers, offering one-week courses in Delco-Remy equipment, is this Detroit unit.

REPOWERED with an Allis-Chalmers marine diesel model 6DASMR-844 and Capitol 3:1 hydraulic clutch, the 34 ft tug *Connie D* owned by the Arthur Des Rocher Towing Co., saves 6 hours running time from Miami to Stewart towing two 40x60 sand loaded barges. The engine horsepower is 196 cont at 1800 rpm. J. Frank Knorr, Miami, supplied the new Allis Chalmers diesel.

A TD24 International diesel tractor with a 180 bhp diesel for Hutchenson Bros. of Pompano Beach and two T55 road scrapers, from Florida Georgia Tractor Co. in North Miami.

THE First Federal Savings & Loan Assn. received another 100 kw Caterpillar diesel generating set powered with a Cat D326 diesel engine. This is one of several similar installations made by Shelley Tractor & Equipment Co. for the various branches of 1st Federal.

THE *Antilles Merchant*, recently converted from a navy LCS to a West Indies freight vessel by the Antilles Shipping Co., is powered with 4 General Motors 6-71 diesel engines rated 170 hp each. For auxiliary power two Hercules 10 kw diesel generating units will be used. A sister ship, the *Antilles Trader* will be added soon.

AT Jacksonville, the Corps of Engineers, took delivery of eleven 2 cyl model 49 Fairbanks-Morse diesel generating sets each rated 49½ hp and three model 49 3 cyl 57 hp diesel generating units.

FOR the Orinoco Mining Co., the 75 ft personnel boat, *Ponte Vedra*, powered with a General Motors 6-110 diesel and Allison Torqmatic marine gear plus an Onan 3 kw diesel generating unit, for use on the Orinoco River in Venezuela, S.A. from the Diesel Shipbuilding Co., Atlantic Beach, Florida.

WHAT probably will be the fastest menhaden fishing vessel in the Gulf, was launched recently for the Quinn Fisheries and christened the *Lorie Clarke Quinn II*. The 110 ft twin screw vessel is powered with 6-110 tandem General Motors diesels and 3:1 Falk r&r gears developing up to 900 hp, plus two 5 kw Onan generating sets.

TWO Northwest draglines, powered with Murphy diesels, one a #25 went to Martin County Commissioners and a #6 went to Broward Engineering Co. of Ft. Lauderdale. Both from Florida Georgia Tractor Co. of Miami.

THROUGH THESE PORTALS pass the best-trained heavy-duty electrical specialists in the business!

Nowadays the key to profit in truck and bus service lies in the speed and efficiency of your operations. To help you reach that level of efficiency, General Motors Training Centers offer you a one-week training course in Delco-Remy heavy-duty electrical equipment—without tuition or obligation. With 30 of these schools throughout the United States, chances are there's one near you.

Designed to teach speed and efficiency, this course gives you or your men a thorough grounding in up-to-date service methods and factory-specified procedures. Expert factory-trained instructors, using the modern testing and service equipment, are your teachers.

The checking, testing and repairing of Delco-Remy heavy-duty voltage regulators, generators, cranking motors, distributors and other units are covered in the most efficient way—through classroom and practical shop experience.

There is no tuition for the course. Tools, equipment and supplies needed during the training period are provided at no cost. The student's only expenses are his transportation, meals and accommodations.

If you are engaged in truck and bus electrical service, apply for this outstanding course for yourself or for your men. To arrange for admission, write direct to Service School, Delco-Remy, or contact your local United Motors System distributor.

GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

DELCO-REMY, DIVISION OF GENERAL MOTORS, ANDERSON, INDIANA

Only the most up-to-date testing equipment is used. Here a student adjusts a truck distributor on a testing machine.

Working with small groups, instructors are able to teach a great deal of automotive electricity in a short time.

George Engine EMD Officials

The management of George Engine Company, Inc., Harvey, La., has recently announced two important appointments within the framework of their organization. The first is that of Mr. Ed Henderson as Assistant Service Manager for Electro-Motive Drilling Rig Equipment. Mr. Henderson has had over 10 years of actual field experience at George Engine Company in all phases of their Service Department; and, prior to this, had extensive Navy service on diesel engines. He and his staff of factory-trained mechanics are well qualified to handle all phases of Electro-Motive service requirements that may arise. Mr. Henderson's entire time will be devoted to handling Electro-Motive equipment exclusively.

The second appointment of note is that of Mr. Willis Miller as Assistant Sales Manager in charge of Electro-Motive Drilling Rig Equipment at George Engine Company. Formerly with the Electro-Motive Division of General Motors Corporation, Mr. Miller has been an active participant in the development of the Electro-Motive diesel electric drilling rig unit and has had extensive field experience. He served Electro-Motive as a field instructor, technical writer and technical engineer before joining George Engine Company.

Northeast Diesel Notes

By **Arnold B. Newell**

THE CURTIS Bay Towing Company has commissioned a sister ship to the 2100 hp *Kings Point*. The new boat, *Falls Point* is also powered by a 2100 hp Alco diesel equipped with DeLaval Hindmarch reverse and reduction gears. The *Kings Point* was fully described in our February issue.

THE MORAN Towing & Transportation Company of New York has taken delivery of two General Motors powered diesel-electric tugs built at the Jackobson Shipyard, Oyster Bay, New York. The first of these, delivered late last year is the 1750 hp *Diana Moran*. Identical hulls are 100 ft 3 in. long, 27 ft beam and 15 ft deep.

IN A year-end financial summary of the Budd Company activities, Mr. Edward G. Budd, Jr., President, cited six major new developments in diesel equipped trains. There are the tubular train, the Hi-Level El Capitan, the Rail Diesel Car, the Flying Cloud for the New Haven and the new Denver Zephyr. Mr. Budd expects "important orders will be placed in 1957" and of course this would stimulate diesel sales.

THE ALTIERI Construction Company of Waterbury, Connecticut, general contractors, recently purchased a Model 255-A P&H Shovel from Gesner Equipment Corporation of Hamden, Connecticut.

A RECENT run down of general contractors who have purchased P&H Model 255-A shovels powered by P&H diesels includes the following from the sales records of Gesner Equipment Corporation, Hamden, Connecticut. Stanley Kement of Broadbrook, Conn., Charles Polidari, New Britain, Conn. and Runde Construction Company of Colchester, Conn.

FRED DORAN of Rochester, New York has purchased 25 tractors from the White Motor Company and 12 from International Harvester for use in his long haul trucking service. Both makes are Cummins diesel equipped.

THE WHITE Motor Company of Cleveland, Ohio has sold 50 Cummins powered tractors to the Dixie-Ohio Freight Lines. Expansion of Motor freight services in the Eastern states is reflected in the purchase of these 50 White tractors driven by Cummins diesels. 10 of them will operate out of Rochester and 40 out of Syracuse, New York.

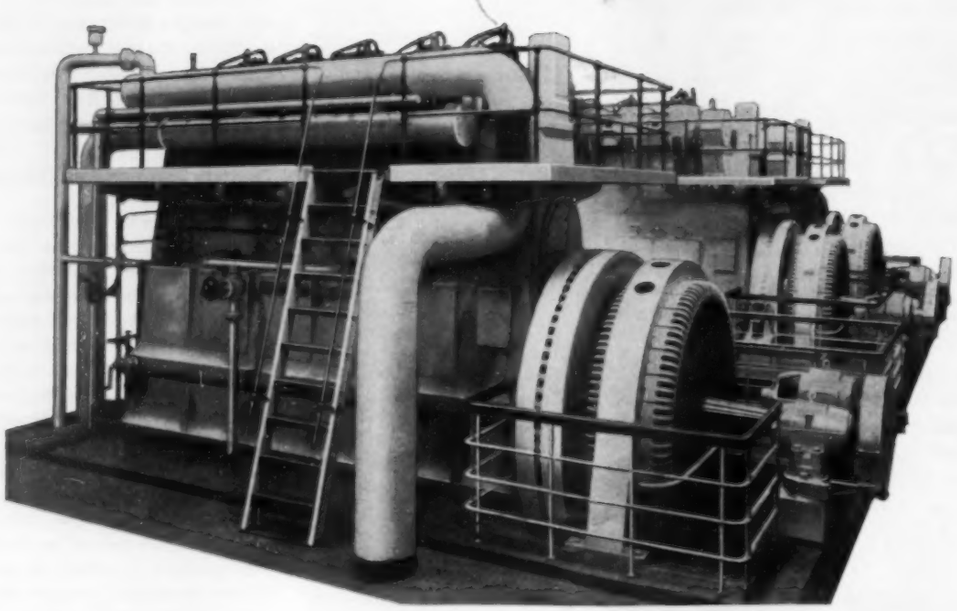
REFLECTING the trend to total dieselization of highway freighting, the Inland Freight Lines of Syracuse is converting 25 gasoline engine powered tractors to Cummins diesel drive.

THE GLADDING-HEARN Shipbuilding Corporation, Somerset, Mass. has obtained a contract to build two dredge tenders for Bay State Dredging Co. of Boston. They are all welded steel boats 43½ ft long 14 ft beam and 6½ ft deep of extremely heavy construction. Power will be single screw General Motors diesels, Model 6-110.

AWARD of the contract for New York City's new 105 ft fireboat has been placed with the John H. Mathis shipyard in Camden, New Jersey. The boat will be powered by four Enterprise diesels of 500 hp each. Particulars of the boat have appeared in these notes.

THE WALTER Motor Truck Company of Ridgewood, New York has sold four special snow and ice removal machines to the New Jersey Turnpike Authority. These are specially designed and built units each one driven by a 250 hp Cum-

STOP Carbon Sludge Varnish



There's good reason why Sinclair RUBILENE® Oil has a great record in industrial Diesel applications. RUBILENE prevents the formation of carbon, sludge and varnish in Diesels. It stands up under highest operating temperatures, provides better lubrication protection to cylinders, pistons, rings and other vital moving parts. It cuts oil consumption, reduces service time to a minimum.

Now's the time to switch to Sinclair RUBILENE. Whatever the make or age of your Diesel, whatever your lubrication problem, there's a RUBILENE or RUBILENE HD Oil that precisely meets your requirements. Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR RUBILENE OILS

mins Turbodiesel. A 30 hp gasoline motor drives a salt spreader on the same machine.

THE AMERICAN Bureau of Shipping reports award of a contract to the Yates Marine Construction Company of Wheeling, West Virginia of a 420 hp towboat for the Monongahela & Ohio Dredging Company of Pittsburgh. Make of diesels not given.

A GENERAL Motors Model 6094 diesel has been sold by Griffin Equipment Corporation of New York to Somerset Stone Company of Bernardsville, New Jersey to repower a Euclid tractor.

E. C. FLAHERTY Company of Long Island City, New York recently purchased two General Motors diesels, Model 4031 C for centrifugal pump drive from Griffin Equipment Corporation of New York City.

A PAIR of Model 4082 and one Model 6082 General Motors diesels have been purchased by the Consolidated Edison Company of New York City. These engines are equipped with Allison Torqmatic Transmissions for use in special equipment.

MR. HAROLD W. Wardle of Orange, Conn., has installed a pair of Cummins JT Diesels in his Constellation type Chris Craft cruiser replacing the original gasoline motors. The engines were sold by Cummins Diesel Engines of Connecticut, Inc., Hartford.

C. W. BLAKESLEE of New Haven, Conn., one of the largest construction contractors in the state recently added a new P & H shovel Model 255A to his fleet of dieselized earth moving equipment. This model is powered by a P&H diesel. The sale was made by Casey-Gesner Equipment Corp. of Hamden, Conn.

ANOTHER P & H model 255A shovel was sold to the I. L. Stiles & Son Brickyard at North Haven, Conn. for use in the clay pits. This brickyard is dieselized throughout. The vendor is also Casey-Gesner Equipment Corp. of Hamden.

Nordberg Distributor

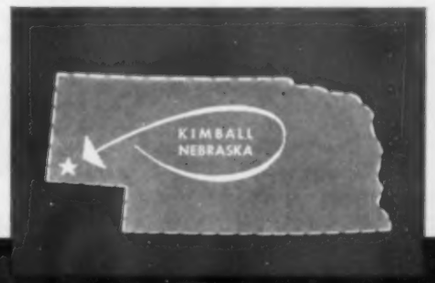
Fred E. Cooper, Inc., Tulsa, Oklahoma will distribute the Power Chief line of Nordberg gas and diesel engines through-out the oil industry. This will associate two long established machinery manufacturers serving the oil industry.

The Nordberg Manufacturing Company, Milwaukee, Wisconsin has been building internal combustion engines since 1912 and Cooper produced the first mobile oil well servicing unit in 1918.

The Nordberg Power Chief engines are heavy duty, medium speed engines offered in one and two cylinder gas engines, 8 to 36 hp and diesel engines to 45 hp. The gas engines basically of heavy duty diesel engine construction, are easily converted to diesel fuel operation where declining gas supplies make the change necessary.

The Fred E. Cooper, Inc. organization with general offices and manufacturing plant located in Tulsa, will stock and service Nordberg engines in Tulsa and at the Cooper Branches in Houston, Texas, Odessa, Texas and Olney, Illinois. Additional sales and service will be provided at Casper, Wyoming, Corpus Christi, Texas, Lafayette, Louisiana, Longview, Texas, Wichita, Kansas and Wichita Falls, Texas. The addition of the Power Chief engines enables the Cooper organization to furnish equipment for well servicing, work-over, drilling and to supply the power for most pumping jobs.

Kimball's power plant saves $58,000 yearly!



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SUPERIOR DUAL-FUEL ENGINES

Six years ago, fast-growing Kimball, Nebraska decided to modernize its inadequate power plant. Today, powered by three Superior Dual-Fuel Engines, Kimball's power plant is saving $58,000 a year over private utility rates. The engines operate with natural gas at an average cost of 6.93 mills per KWH. On diesel fuel alone power costs are 10 mills per KWH, and annual savings would be $35,000.

The first engine paid for itself in savings in less than three years! Repeat orders later demonstrated the confidence of Kimball city fathers in Superior engine quality. As a further bonus, the three engines are expected to give good service for 35 to 40 years, according to the town's Public Works Director.

Such *savings, satisfaction* and long-term *service* are characteristic of White's Superior engines. See how you can participate in "Kimball-type" savings. Call or write the nearest office listed below. Let White's engineers discuss the new features of Superior and Atlas engines, ranging from 100 to 2150 H.P., for power to 1500 KW.

White Diesel

WHITE DIESEL ENGINE DIVISION

THE WHITE MOTOR COMPANY Plant and General Offices: Springfield, Ohio

SALES AND SERVICE POINTS: Ketchikan, Alaska • San Francisco, Terminal Island, California • Denver, Colorado • Washington, D. C. • Clearwater, Florida • New Orleans, Louisiana • Boston, Mass. • Park Rapids, Minnesota • Webster Groves, Missouri • Callaway, Nebraska • New York, New York • Portland, Astoria, Oregon • Ft. Worth, Houston, Texas • Seattle, Wash. • Halifax, Nova Scotia • Vancouver, B. C.

Michigan-Ohio News

By Jim Brown

THE MARINE Operators, composed of four construction companies—Al Johnson Construction Co. of Minneapolis, Minnesota, Peter Kiewit Sons Co. and Cunningham Kiewit Co. of Omaha, Nebraska and Morrison-Knudsen Company of Boise, Idaho were awarded a contract in the amount of $6,635,596.00 for dredging the upper portion of Hackett Range, consisting of approximately 2 miles of the 8½ mile length of the Amherstburg Channel. The Marine Operators were recently awarded a $9,686,952.00 contract for dredging the upper 4 miles of the Amherstburg Channel. Marine Operators, at the present time hold contracts totaling $16,322,548.00, for dredging a total of approximately 6 miles of the Amherstburg Channel. This is all part of the Seaway project under the direction of the U. S. Army Corps of Engineers.

THE GRAND Rapids branch of Wolverine Tractor and Equipment Company has just delivered an International Harvester TD-6 Drott-Skid crawler tractor to Mr. Gordon A. Kilgore of Kalamazoo, Michigan.

TELFORD Equipment Company of Detroit has delivered to the City of Port Huron an Adams 440 Motor Grader with a Cummins model JF6BI diesel engine.

EARLE Equipment Company of Detroit has recently repowered a K-12 Insley crane with an Allis-Chalmers 6DT 317 diesel engine for the Reamer Brothers of Lapeer, Mich.

PENINSULAR Diesel of Detroit has delivered to McPherson Community Health Center of Howell, Michigan a 100 kw GM Detroit Diesel electric standby generator set.

RAY REED'S Garage, Grand Rapids distributor for Mack trucks delivered two B-61T Thermodyne Mack diesel trucks to Mr. William De Mull of Grand Rapids, Mich.

A CUMMINS 600 hp turbocharged VT-12-I was sold by Cummins Diesel Michigan, Inc. to Marens-Fader Equipment Co. of Detroit. The new Cummins diesel will be installed in a dredge barge with a 12 in. pump for Mickelson Bros. of Oxford, Mich.

MARIETTA Manufacturing Company of Point Pleasant, West Virginia has purchased two 6-110 GM Detroit diesels to power a new boat, now under construction. The sale was made by Ray C. Call Company of Steubenville, Ohio.

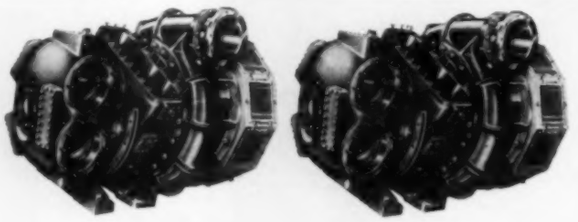
A 75 kw generator set powered by a model MO82A3H Allis-Chalmers diesel has recently been sold to Michigan Hatfield Electric Company of Marquette and will be installed in a new hospital in Alpena, Michigan. The sale was made by Earle Equipment Company of Detroit.

R. G. MOELLER Company of Detroit sold a 99L Austin-Western Motor Grader equipped with a torque converter and powered by a 4-71 GM Detroit diesel to the Ford Motor Company of Dearborn, Michigan.

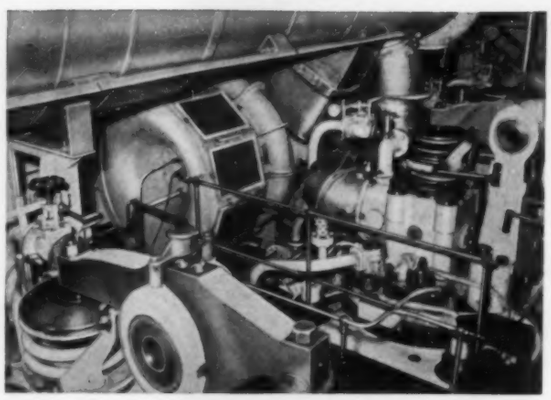
CUMMINS Diesel Michigan, Inc. is installing an NHB600 Cummins diesel in a model LJ Mack truck for Superior Transportation of Bay City, Mich.

THE CITY of Saginaw, Michigan has a new IH TD-14 crawler tractor equipped with a hydraulic straight blade. The sale was made by the Detroit branch of Wolverine Tractor and Equipment Company.

WJBK-TV studio building of Detroit



These Napier Turbo-blowers were chosen

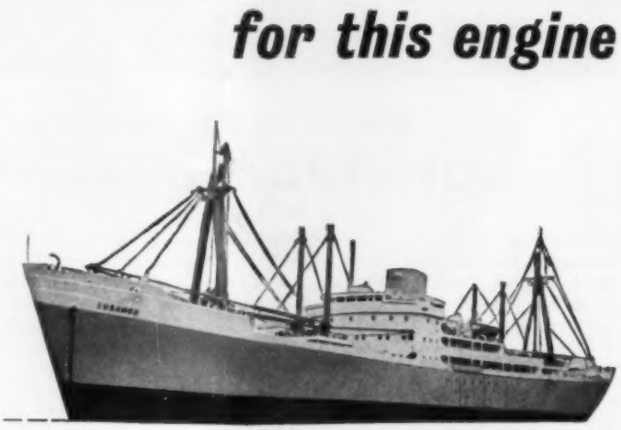


Two Napier Type MS 600 turbo-blowers are fitted to the Burmeister & Wain 6-cylinder single-acting two-stroke diesel engine which powers the Compagnie Maritime Belge (Lloyd Royal) M.V. LUSAMBO. This Burmeister & Wain engine was made under licence by S. A. Cockerill and Ougrée in Belgium. The ship is one of three which have Burmeister engines with *Napier* turbo-blowers. Why were *Napier* turbo-blowers chosen? Here are three good reasons:

- Napier blowers have *high adiabatic efficiency*, resulting in maximum power increase and low fuel consumption.
- Journal bearings on the MS 500 and 600 Napier blowers are sleeve type, and with proper lubrication they will last as long as the engine itself. The MS 500 and 600, the largest blowers in the Napier range, are built especially for marine applications.
- A high standard of workmanship is guaranteed by Napier's long experience in precision engineering.

Napier turbo-blowers are available in seven sizes for engines of 140-4,000 h.p. afloat and ashore. Multiple installations for engines of higher powers. On 4-stroke diesels they can double the power, on 2-strokes they increase it by over 30% —often at a lower specific consumption. Napier turbo-blowers are currently in use in 69 countries.

for this engine



which powers this ship

NAPIER Turbo-blowers

D. NAPIER AND SON LIMITED • LONDON • W. 3. • ENGLAND

CRC T14

Representative: L. O. Brooks, 909 Dupont Circle Bldg., 1346 Connecticut Ave. N.W., Washington 6, D.C. Phone: North 7-0146

has accepted delivery of a 245kw GM Detroit diesel generator set for installation in the basement of WJBK-TV's new studio building. The generator set will be disassembled and reassembled by Peninsular Diesel of Detroit.

MR. A. K. Miller of Detroit has repowered his Haiss Loader with an Allis-Chalmers 6D273 diesel engine. The A-C diesel was sold by Earle Equipment Company of Detroit.

THE GRAND Rapids branch of Wolverine Tractor & Equipment Company has delivered an International Harvester TD-18 crawler tractor equipped with a hydraulic straight blade bulldozer. The delivery was made to Mead Brothers of Springport, Michigan.

A 245 KW GM diesel-electric generator set has been delivered to the Ingham County Road Commission of Michigan by Peninsular Diesel of Detroit. The new generator set will be used to power a Pioneer black top mixing plant.

MR. HOMER Shingledecker of Pontiac, Michigan has a new International Harvester TD-24 crawler tractor equipped with an IH P-29 winch and a cable bulldozer.

MICHIGAN State University Grounds Dept. of East Lansing is repowering an Austin-Western model 88 Motor Grader with an Allis-Chalmers 6DT468 diesel. The A-C diesel was sold by Earle Equipment Company of Detroit.

MONTCALM County Road Commission in Stanton, Michigan purchased a TD-24 crawler tractor through the Grand Rapids branch of Wolverine Tractor & Equipment Company.

THE EDWARD C. Levy Company, Detroit, has received delivery on a new HD-16 Allis-Chalmers crawler tractor from the Earle Equipment Co. of Detroit. The HD-16 is driven by a model HD-844 A-C diesel engine.

Technical Representative

E. F. Koenig has been appointed Technical Representative of the Technical Services Division of The Texas Company's Research and Technical Department, according to Frederic H. Holmes, Vice President in charge of the Department.

In his new position, Mr. Koenig will specialize in the field of additives for petroleum lubricants. His headquarters will be at Beacon, where the Texaco Research Center is located. Other Texaco Technical Representatives are located in Detroit and Pittsburgh. The former serves primarily the automobile industry and the latter primarily the steel industry.

Mr. Holmes said the use of additives in industrial lubricants is expected to expand rapidly, and he pointed out that Texaco is now building a large additives manufacturing unit at its Port Arthur Works in Texas, largest of the Company's 11 refineries in the United States.

Until his recent promotion, Mr. Koenig was a Technical Services Associate.

Middle West Representative

The Briggs Filtration Company of Washington, D. C., has appointed R. C. (Swede) Swenson, Jr., as representative in the middle west for automotive filter sales, which includes the truck, bus and construction equipment fields. His headquarters will be The Briggs Filtration Company office at 1335 West Randolph Street, Chicago 7, Illinois, Telephone: Haymarket 1-7400. Mr. Swenson has been associated with filter sales for the past eight years, prior to which he served seventeen years in the U. S. Navy.

Bigger return on investment with GM Turbocharged Diesel Power

"With the new 2,000 shaft horsepower GM Turbocharged Diesel engine in our new tug *Matton*, we've gained more than 25% in the time of towing oil barges over similar tugs having less horsepower. This is only one of the reasons why we're getting a bigger return on our investment with GM Turbocharged Diesel power."

That's Ralph Matton, Secretary and Treasurer of John E. Matton & Son, Inc., reporting on the performance of the first tug powered with the mighty General Motors Turbocharged Diesel engine. Another new tug, *Matton 25*, has just gone into service and construction has just been started on a third sister tug. These tugs operate on the New York State Barge Canal, the Great Lakes and on the East Coast.

The reason for this excellent performance is clear. For a GM Turbocharged Diesel delivers more power per cylinder, weighs less per horsepower, too. And it delivers better fuel economy because it operates at higher thermal efficiency. For the full story on this great new Diesel, write or wire us today.

A GOOD PRODUCT PLUS GOOD SERVICE GIVES TOP PERFORMANCE

CLEVELAND DIESEL

An Engine Division of General Motors · Cleveland 11, Ohio

Keep up with the *Diesel Times*. Just write — we'll be glad to put you on our mailing list.

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Chicago, Ill., 216 West Potomac Ave., Lombard, Ill. Tel.: Randolph 6-9214
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Honolulu, T. H., 3115 Diamond Head Road. Tel.: Honolulu 99-9202
New Orleans, La., 727 Baronne St. Tel.: Magnolia 6761
New York, N. Y., 10 East 40th Street Tel.: Murray Hill 3-4372
Norfolk, Va., 554 Front Street Tel.: Madison 2-7147
Orange, Texas, 212 First Street Tel.: Tuxedo 3-4226
Pittsburgh, Pa., 469 Marlin Drive Tel.: Locust 1-2173
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St. Louis, Mo., 2 N. Wharf St. Tel.: Main 1-0642
San Diego, Calif., 3886 Sequoia Street Tel.: Broadway 3-1752
San Francisco, Calif., 870 Harrison St. Tel.: Douglas 2-1931
Seattle, Wash., 1230 Westlake Ave. N. Tel.: Adler 1440
Wilmington, Calif., 433 Marine Avenue. Tel.: Terminal 4-4098

GM CLEVELAND DIESEL

Charles G. Cooper Elevated

Charles G. Cooper

The appointment of Charles G. Cooper to the export division of the Cooper-Bessemer Corporation has been announced by Lawrence F. Williams, Cooper-Bessemer President. In his new capacity, Mr. Cooper will serve as Vice President and Director of the parent company and as Vice President of the subsidiary companies, namely the Cooper-Bessemer International, Cooper-Bessemer Overseas Corporation and Cooper-Bessemer of Canada, Ltd. The export offices at New York City now direct the application and sales of compressors and engines for shipment to all parts of the world. This equipment includes reciprocating and centrifugal compressors for pipeline transmission for petrochemical, refinery, chemical and industrial use. The engines are diesel, gas and gas-diesel types for railway diesel locomotives, marine and industrial power. Mr. Cooper was in charge of government and Southeastern district sales, and he joined the New York offices on January 1st, 1957.

As a result of his association with numerous defense programs of this country, Mr. Cooper has served with various defense organizations, including the Secretary of Defense's Joint Orientation Conference. Mr. Cooper is currently a council member of the Society of Naval Architects and Marine Engineers as well as a Director of the Washington Society of Engineers. He has been an active member of the American Society of Mechanical Engineers having served as Vice Chairman of the Oil and Gas Power Division's national meeting and has served as President of the Yale Club of Washington and as representative of the Yale Alumni Board. Mr. Cooper is a member of the University Club, Metropolitan and Chevy Chase Clubs in Washington and is a member of the Yale and St. Anthony Clubs in New York City.

Cooper-Bessemer's offices in Washington, D. C., will continue under the direction of Frank W. Quiggin who has been named Southeast District Manager effective January 1st. The main offices of the company are at Mount Vernon, Ohio. Manufacturing plants are located at both Mount Vernon, Ohio and Grove City, Pennsylvania.

EATON VALVES are Backed by 35 Years of Diesel Engine Experience

Eaton Diesel Engine Valves are produced to meet the exacting requirements of Diesel engine service. Through more than 35 years of co-operating with the country's leading Diesel engine manufacturers, and furnishing valves to them, Eaton has developed a thorough understanding of the problems peculiar to the Diesel field. Eaton's experience is reflected in the outstanding performance records achieved by Eaton-made valves in all phases of Diesel engine service.

Eaton Diesel Valves are produced in a wide range of materials, and in both faced and unfaced designs.

Our engineers will welcome the opportunity to discuss the application of Eaton valves to your engines.

EATON

VALVE DIVISION
MANUFACTURING COMPANY
9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Towboat *Queen City*

Recently the Ohio River Company put its newest towboat, the triple screw *Queen City* in service between Cheshire and Pittsburgh. The 3240 hp *Queen City*, designed and built by the St. Louis Shipbuilding & Steel Co., is the ninth towboat, and the fourth triple screw boat, built by that Yard within the past two years for The Ohio River Company. The new 164 ft x 44 ft vessel is named in honor of the "Queen City of the West", Cincinnati, Ohio, home office of The Ohio River Company.

The *Queen City*, like her sister ships, the *John J. Rowe, Walter C. Beckjord*, and the *Ovec*, is powered with three Baldwin-Lima-Hamilton Model 606-Sc marine diesel engines. The new towboat should prove to be as outstanding a pusher as the other St. Louis Ship boats in The Ohio River Company fleet.

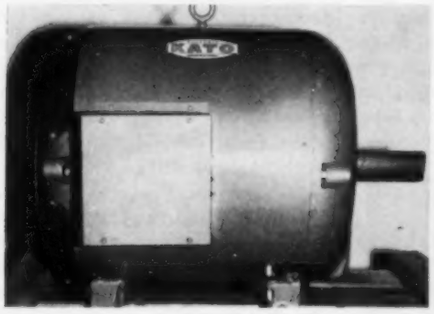
Advertising Manager Appointed

Harry M. Gill

Appointment of Harry M. Gill as Advertising Manager of the Young Radiator Company has been announced by F. M. Young, president. Mr. Gill, who assumed his new duties January 2, was formerly Advertising and Marketing Service Manager for Airtex Products, Inc., Fairfield, Ill. Previous to that he spent five years as Advertising Manager of Tamms Industries, Inc., Chicago, and also was with the Buchen Company, Chicago advertising agency. A veteran of World War II, Gill

served in the Pacific Theater. He attended the University of Illinois and Northwestern University.

New Generator



An ac generator that will produce approximately 20 kva at 1200 cps has been made available by the Kato Engineering Company, Mankato, Minnesota. As illustration reveals, the machine has no separate dc field exciter. The 40-pole alternator is designed for 125-volt dc excitation from an external source. Generator is 30 in. long, 24 in. wide, and weighs 775 lbs. These generators are available in either single or three phase in all standard voltages such as 110/220 or three-phase 4-wire 120/208. Kato specializes in building high frequency generators and motor-generator sets with emphasis on 400-cycle generating equipment. Response time is as low as .1 second. M-G sets and generators are available with magnetic amplifier that permits closer, more uniform regulation with no moving parts. Regulation can be kept within plus or minus one per cent. Harmonic content is generally less than one per cent line to line three phase; and less than three per cent on single phase or line to neutral three-phase. Form factor is 1.41 plus or minus five per cent or better. (ITS NEW)

Annual REA Conference

The 8th Annual REA Electric Generating Plant Operation and Maintenance Conference will be held at the Phillips Hotel, Kansas City, Missouri, from April 8, 1957, through April 11. Sessions on steam and diesel plant operation and maintenance will be in progress jointly or separately as in the past.

Included in the program will be the presentation of two DIESEL PROGRESS plaques for the year 1956, one to the most efficiently operated REA internal combustion generating plant of over 5000 kw capacity, and one to the most efficient plant of under 5000 kw capacity.

The Conference Committee has asked us to make it clear that this conference is not restricted to REA cooperatives entirely. The Committee wishes to invite any municipality or utility that desires to send a delegate. A five dollar registration fee is all that is required. For additional information, contact Mr. Andrew S. Reiff, N. W. Electric Power Cooperative, Inc., 312 North Chestnut St., Cameron, Missouri.

We at DIESEL PROGRESS want to urge all those who can to attend this Conference because there are always many topics of interest and importance to plant operators in general on the program.

A Channelcromed
Diesel Engine Liner

★ An engine manufacturer, familiar with all types and brands of chromium, wrote: "We are all pleased at the new low in the rate of wear as with Channelcromium."

★ A railroad informs us: "Channelcromium on the bores of the liners of EMD 567 locomotive engines has established a new, all time low for the rate of lubricating oil consumption."

★ An engine manufacturer writes: "We have nothing but the highest praise for Channelcromium."

A Channelcromed EMD 567 diesel engine liner.

GO FIRST CLASS—with CHANNELCROMIUM. Ask for Bulletin 74.

PENNINGTON CHANNELCROMIUM COMPANY

319 Dakota Street San Antonio 3, Texas

ALMOST ALL THE BIG, NEW TOW BOATS YOU READ ABOUT ARE BRIGGS EQUIPPED. FOR INSTANCE, CHOTIN'S NEW MV CYPRESS WITH TWO 2100 BHP SUPERCHARGED DIESELS.

THERE IS A REASON FOR SUCH

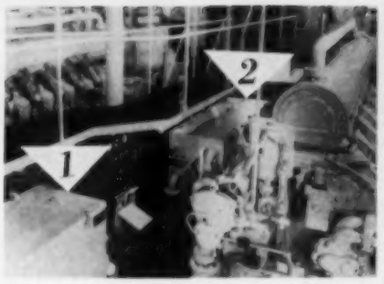
wide acceptance of Briggs . . whatever the size ship or unit, one important quality built in every Briggs filter is keeping abreast of the times with both product and field research that both designer and user can utilize.

AN EXAMPLE OF THIS

"keeping apace" is our new report

"WATER AND ABRASIVES REMOVAL FROM FUEL OIL OF SEA GOING VESSELS."

Write for your copy . . . no obligation



TWO BRIGGS UNITS PROTECT THESE DIESELS.

Briggs **OIL FILTERS**
FILTER/SEPARATORS

THE BRIGGS FILTRATION COMPANY, DEPT. 154 WASHINGTON 16, D.C.

WATER AND ABRASIVES REMOVAL FROM FUEL OIL OF SEA GOING VESSELS

SEND ME, FREE OF COST OR OBLIGATION, a copy of your report on filtration and water separation for sea going vessels.

Name .....

Company .....

Address .....

Midwest Diesel News

By L. H. Houck

WOOLRIDGE Scraper, which uses a Cummins diesel, has established a Mid-West factory parts warehouse at Melrose Park, Ill., which is operated by Western Contractors Supply Co. Woolridge scrapers are made in Sunnyvale, Calif.

ALLEN & Shipp, Potosi, Mo., have taken delivery on an International TD-14 and bulldozer from Mo.-Ill. Tractor Co., St. Louis. It will be used in general work.

ROLLA SLOAN, Ellington, Mo., has purchased an Allis-Chalmers HD-6-B for general custom work, from Chiles at Springfield.

R. B. TYLER Construction Co., Louisville, has an $800,000 construction contract on State Highway 20 in Crockett County, Tennessee, which is an Allis-Chalmers diesel job, except for a Case 520 diesel used on a sheepsfoot roller. A-C equipment with Buda division diesels include four TS-300 scrapers, two HD-21's, one HD-20, an HD-16 and an HD-15 in crawlers; an HD-9 with front-end loader, AD-40 motor grader and two TS-200 scrapers.

DART TRUCK Co., Kansas City, Mo., have brought out a new 35-ton end dump truck with a 400 hp Cummins diesel, a down-hill retarding torque converter and a special design, heavy-duty-three-speed transmission. The vehicle weighs 63 tons and cab is designed for automatic air conditioning. The truck carries 24 cu yds struck.

HUBER-WARCO Co., Marion, Ohio, have added Cummins diesel driven units to its line of motor graders, ranging from the 6-D2, powered with a 125 hp JN-6-BI Cummins to include the 7-D2, powered with a 150 hp JBIS-600 Cummins. The 6-D and the 7-D models are powered with GMC diesels.

CLARKSON Const. Co., Kansas City, Mo., put two International 95 Payhaulers in service on a rock cut job in Southeast Missouri. Part of the haul road included a 12 per cent grade which was controlled with the Torqmatic braking control.

CONVERSION kits are now available for Caterpillar D386 and D364 to permit the use of natural gas and spark ignition where that fuel is most economical. Only counter-clockwise rotating engines may be converted which do not use turbochargers.

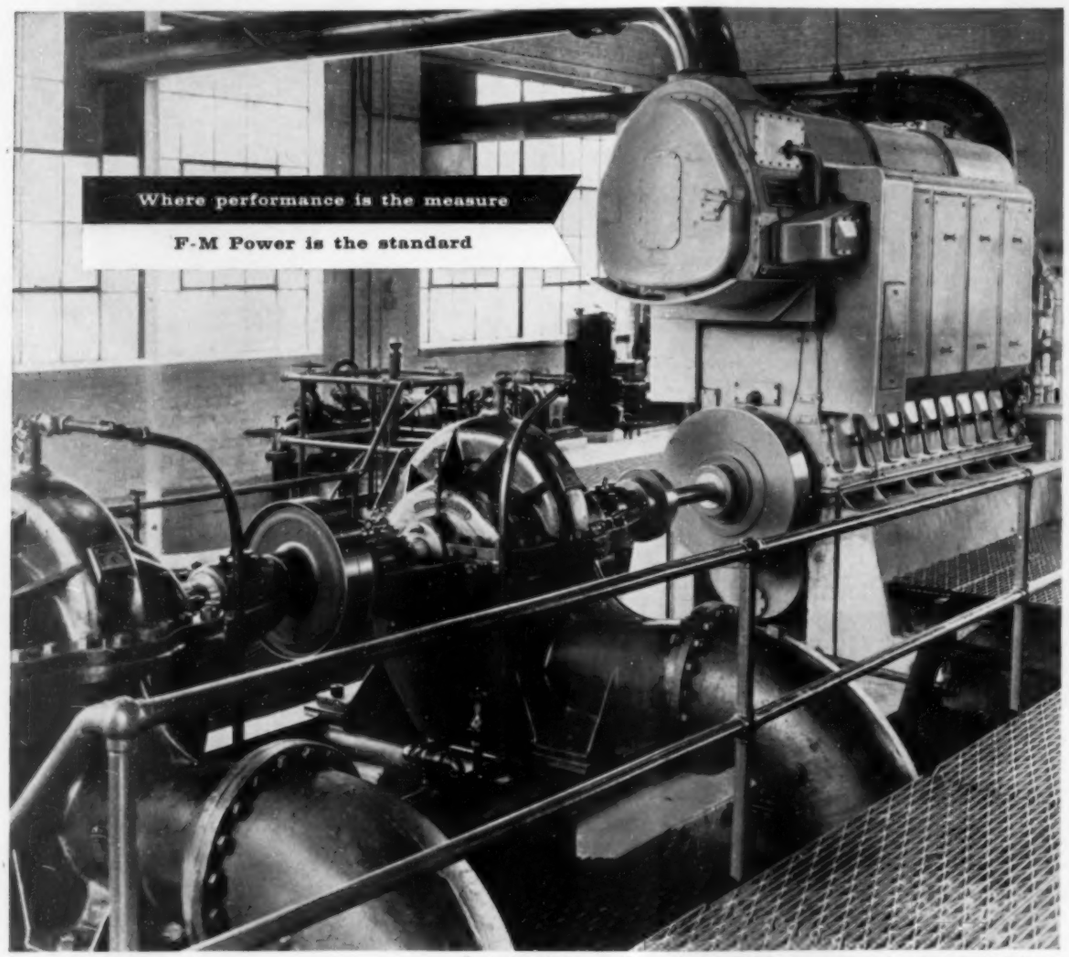
DEUTZ air-cooled diesels are now optional equipment on Four-Wheel Drive trucks made by the company of the same name in Clintonville, Wis. The air-cooled V-8 diesel, made in Germany, is 170 hp and can be used to power the 4-wheel and 6-wheel drive units up to 40,000 lbs.

DUVAL Engine & Equipment Co., 1830 E. 30th St., Cleveland, Ohio, was recently appointed Murphy diesel dealer for eastern Ohio. Murphy diesels range from 96 to 264 hp. They also manufacture a diesel generator set in the range of 64 to 165 kw, AC or DC.

CUMMINS, McGowan & West, Inc., 9100 Olive Street Road, St. Louis, have been appointed Murphy diesel dealers for eastern Missouri and Southern Illinois.

CUMMINS Missouri Diesel Sales Corp., St. Louis, has sold two 335 hp Model NRTO-6-M Cummins Turbodiesels for installation in a Barbour Metal Boat.

R. A. (DICK) Trippeer, president of the Trippeer Organizations with Euclid dealerships in St. Louis, Memphis, Nashville, Knoxville, Louisville, Little Rock, Shreveport, Baton Rouge and Jackson, Miss., placed the largest single order



Latest addition to Greensboro's F-M power-pumping team which includes two 14", three 20" and one 16" single stage, double-suction, centrifugal pumps. All are driven by O-P diesels totaling 3175 hp.

Greensboro Saves $46,300 Yearly with Fairbanks-Morse Power-Pumping Team

Increased capacity at operating costs that are lower by 55%—that is the record set by 3100 hp. of Opposed-Piston diesels and the six F-M pumps they drive in the water system of Greensboro.

Such a "required standard" of performance has been set by F-M diesel and dual fuel engines in all classes of municipal service the country over. Apply the measure of performance to your power requirements and see what the F-M standard of dramatic economies in operating costs can save you.

Fairbanks, Morse & Co., Department DP-3, Chicago 5, Illinois.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

ever received by the Euclid Division of GMC—$11 million worth of earthmoving equipment.

HALLEYS Sand & Gravel Co., Dahlgren, Ill., bought a 180 hp HRFBI-600 Cummins diesel to power an 8-in. gravel pump. Sale was made by Cummins Missouri Diesel Corp., St. Louis.

SEEBOLD Equipment Rental Co., of Granite City, Ill., has purchased an International TD-14 with Drott loader from Mo.-Ill. Tractor Co., St. Louis, to be placed in its rental equipment service.

DENVER & Rio Grande Western Railroad has retired its last standard gauge steam locomotive, replacing it with a new diesel locomotive. The only steam units remaining in service on this line are used on the 300 miles of mountain lines out near Durango in southwestern Colorado.

AN Allis-Chalmers HD-6-G with loader has been delivered to C. L. Matherly, a gravel contractor of Xabool, Mo., by Chiles Tractor & Machinery Co., Springfield, Mo.

LARGEST and most powerful dipper dredge on the Great Lakes is now working on the St. Lawrence Seaway project. It is owned by the Great Lakes Dredge & Dock Co., Chicago. It was repowered last summer by Knudsen Bros. Shipbuilding & Drydock Co., Superior, Wis. New power is an 8 cyl. Nordberg Supairthermal diesel with 13-in. bore and 16½-in. stroke, which drives four dc generators through a Falk flexible coupling.

R. C. WONN, Corb, Wis., has installed a 300 hp Model NRT-6-P Cummins Turbodiesel in his Cedar Rapids rock crusher. Sale was by Cummins Diesel of Wisconsin, Milwaukee.

KENOSHA County Highway Commission, Wisconsin, has converted the power on a Model 685 Autocar truck to a 175 hp JT-6 Cummins Turbodiesel.

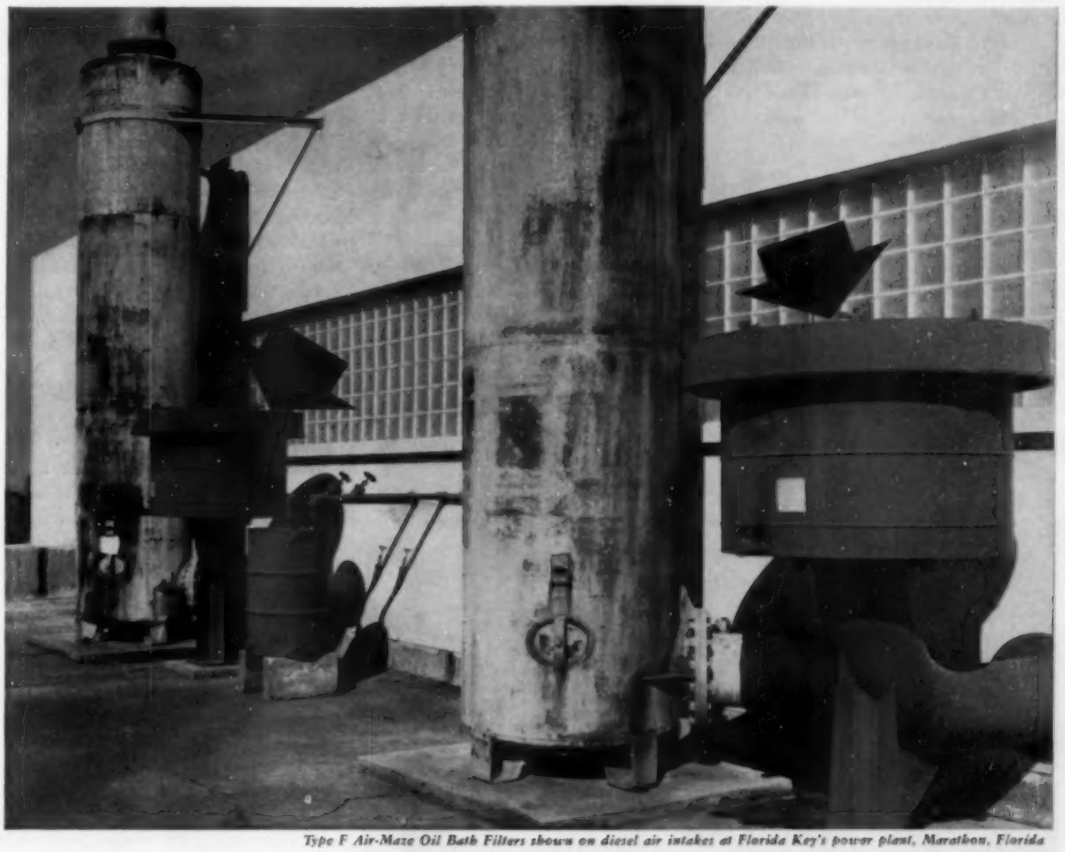
Indicating Tachometers

Effective operation of many prime movers and other machines depends largely upon uninterrupted indication of the speed at which they operate. To meet this condition Amthor Testing Instrument Company of Brooklyn, N. Y. has produced a line of indicating Tachometers constructed on the mechanical principle and they are therefore independent of temperature variations and magnetic influences. Since they are extremely sensitive the slightest variation in speed is indicated instantaneously. They have a guaranteed accuracy of half of one percent of maximum range and are available with six, eight and ten in. dials. (ITS NEW)

New Association

A new association of importance to the Diesel Industry has recently been formed. It is called the *Association Of Diesel Specialists*, and includes companies or concerns engaged in servicing and selling diesel fuel injection equipment, governors and immediately related accessories. The first meeting of this Association was held November 17 through 19, 1956 at the Palmer House in Chicago, and the following officers were elected: President - H. E. Wittersheim of Diesel Fuel Injection Sales and Service, Norfolk, Virginia. Vice-President - M. A. Gerhardt of Gerhardt's Inc., New Orleans, Louisiana. Secretary - S. E. Franklin of Diesel Control Corp., Wilmington, California. Treasurer - V. J. D'Aversa of A & D Diesel Service, Brooklyn, N.Y.

For further information on this new association write to Mr. S. E. Franklin, Diesel Control Corp., 226 N. Marine Ave., Wilmington, California.



Type F Air-Maze Oil Bath Filters shown on diesel air intakes at Florida Key's power plant, Marathon, Florida

Eight types of Air-Maze air filters for every diesel engine requirement!

THE TYPE F AIR FILTER shown is only one of eight different types that Air-Maze supplies the engine and compressor industry.

For large volumes of air with extremely low pressure loss, the Automaze self-cleaning curtain filter or the LPD cylindrical type are available.

The DA dry type is selected when varying air flow is encountered or where an oil-free filter is required.

Multimaze and DH panel assemblies provide adequate impingement filtration where dirt loads are low and where low initial cost is a factor.

Type J stack type oil bath filters are designed for smaller air volumes on mobile equipment.

Electromaze electronic filter is used where submicronic dust must be removed.

To select from the widest line of industrial filters anywhere—whether for air or for liquids—check with Air-Maze first.

AIR-MAZE CORPORATION, Cleveland 28, O.

AFI MEMBER

The biggest names in diesels are protected by Air-Maze filters

AIR FILTERS
SILENCERS
SPARK ARRESTERS

AIR-MAZE
The Filter Engineers

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS

Farm Equipment News

By F. Hal Higgins

The annual Christmas party of the California Tractor & Implement Club brought together in Oakland on December 7 manufacturers' branch officials for all the farm tractor and machinery lines. A sampling of key men for news of new models, plans for 1957 and changing of personnel by DIESEL PROGRESS' western field editor, who has been attending these Tractor Club meetings and annual parties for some 26 years brought up these items:

International Harvester Company's Branch Manager Knudsen was in Chicago for high level conferences and a look at the new British-built B250 that is aimed at the wheel tractor field of the U.S. International will step up its present tractor production of 100 per day to 150 Farmalls at its Rock Island plants, said IHC branch officials present as they pointed to the business statement just released by Chairman of the Board McCaffrey and President Moulder. Several hundred more employees at both Louisville and Rock Island plants will be back on the job late in January. The final quarter of the fiscal year of 1956 shows an increase of 7% over same period of 1955. Materials, wages and transportation costs went up about 60 millions for the year, which reflects the labor increased costs all down the lines back to the raw materials of ore and coal. One bright spot in new diesel tractors pointed to as ready for the 1957 sales is the British-built B250 that International has imported from its foreign factory. This idea of building in a company foreign factory and importing for the U.S. market has been successfully used by the Ford Dearborn Corporation for their Fordson Major diesel tractor that came into the field two years ago. International officials are confident they face a bigger and better year ahead for both farm and industrial lines with their wide coverage of many fields of agriculture and industry with both crawler and wheel diesels as well as engines.

Sam White, Jr., who has been stationed at the Oakland branch of Oliver Corporation, was also missing because of a call to Chicago headquarters and elevation to a vice-presidency. But Oliver branch men at the Christmas party including "Trit" Trittipo of the crawler industrial end were enthused about their demonstration of an Oliver OC12 diesel at King City, California, before the U.S. Forest Service.

H. F. Anderson, Pacific District Manager for Minneapolis-Moline, was over from Stockton for the party. In answer to questions about his company's announcement a few days earlier that M-M is putting a crawler tractor on the market for the first time for his company, he said the same diesel engine that powers their 445 will be in the crawler. M-M is definitely going after more industrial business.

Allis-Chalmers' branch manager could not get back from a factory huddle in Milwaukee. Seen a few days before, he reported A-C business up and big plans for 1957 in the crawler diesel sizes on roads, logging, strip mining and dam construction with new models in the offing to meet increasing demands. Allis-Chalmers showed a definite up-swing in California business in 1956. The company is engineering for a bigger piece of the big road building pie being served diesel equipment builders for 1957. The traction booster has lifted their WD-45 wheel tractor into a strong position in the western farm business.

Tilford Newell, promotion director for Pacific Tractor & Implement Company, Ford distributor for Northern California and Nevada, reported the Fordson Major diesel tractor, that came in from England two years ago, has been so popular with both farmers and small contractors that it is offered in both tricycle and 4-wheel standard models. In the suburban areas of central California, the dealers are making more industrial than farm sales. Both Pacific and the manufacturer plan more industrial sales for 1957.

Vice-President Lloyd Myers of Massey-Harris was brimming with confidence in the new models and diesel tractors, combines and the attachments and accessories being developed by his company's system of factories in U.S., Canada, Australia and England. M-H have a line of diesel tractors aimed at the booming fields of industry. Both their Ferguson line as well as the old M-H line of tractors carry diesel engines in all the foreign fields.

Banker representatives were headed by the popular "Scotty" Watson of American Trust, who has been attending Tractor & Implement Club dinner meetings for several years. Bankers today court the tractor manufacturers and dealers as sound business. The coming of diesels to the tractor a quarter century back has speeded the arrival of the farm machinery industry as a solid, safe investment for agriculture. Agriculture in the West uses its tools interchangeably among farming, logging, road and street building, land levelling, strip mining, dam and canal construction, and a thousand and one lesser chores for the wants of an expanding population

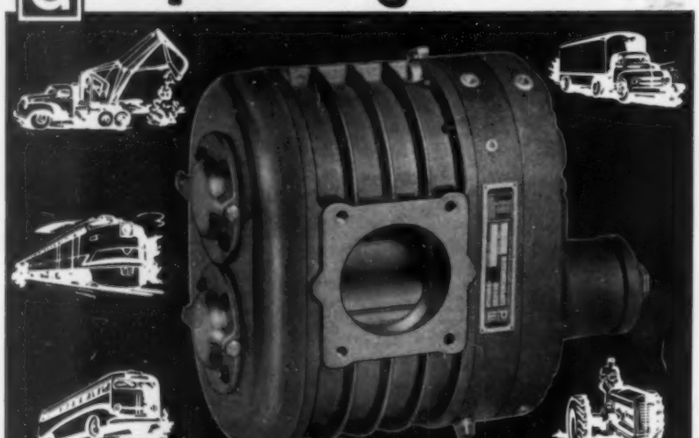
Deere & Company branch, like several of the other big full line manufacturer branch heads, was represented by its second echelon of officials in the absence of Manager Jim Bohmer, called east for a big huddle. The recent acquiring of the old German Lanz line will open up the outside world to Deere products for both farm and industry. Deere will give increased attention to development and sale of diesel equipment. President Bill Hewitt, a former member of the local club, had referred DIESEL PROGRESS to the western branch men in answer to questions on the coming policy as to whether the German diesel line acquired by Deere would be imported for U.S. Deere's Killefer works at Los Angeles, way back in 1926, offered the first front shovel loaders on the old Best and Holt crawlers and had developed dozers for ditch filling at that early stage.

Davis Buys Engine Co.

As reported in the New York Herald Tribune on Nov. 16, 1956, we quote: "The long-rumored acquisition of controlling interest in American M.A.R.C., manufacturers of lightweight, low-horsepower diesel engines, by Arthur Vining Davis, Florida financier, was confirmed today at a general stockholders meeting (Los Angeles, Nov. 15). American M.A.R.C. holders ratified a proposal to change the par value of outstanding common stock from $1 a share to no par—thus paving the way for Mr. Davis to purchase 1,140,000 of the 1,706,050 shares outstanding.

"Control of American M.A.R.C. brings Mr. Davis, the largest individual stockholder in Aluminum Corp. of America, into a new field in which aluminum is a large factor in the finished product. A major portion of American M.A.R.C. diesels are cast of aluminum, utilizing several patented production processes. American M.A.R.C. produces the new,

DIESEL ENGINES NEED
Supercharged Power



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ACCELERATE YOUR ENGINES FASTER

Wherever Diesel engines work—buses, tractors, trucks—a Miehle-Dexter Supercharger adds a big boost to performance. Power is increased by the simple addition of this compact, space-saving supercharger. That means *extra* speed at any load, *extra* pushing or pulling power at any speed, wider speed range. More, it means faster acceleration with less smoke. Add all this to engines without increasing size, weight or cost. In fact, weight per horsepower is decreased. Standard M-D models available for most engine applications. For more facts, call or write Miehle-Dexter.

Soon available AN ENTIRELY NEW TYPE OF TURBOCHARGER

MIEHLE DEXTER
Supercharger Division of
The Christensen Machine Co.
116 Fourth St., Racine, Wisconsin

small diesels at its factory in Inglewood, Calif. Uses for the small engine include operation of electric generator sets for home lighting, on Texas Towers as a power supply for auxiliary purposes, for tractors, pumps, in refrigerated freight cars and at jet airfields, where they operate on the same fuel as used by aircrafts.

"According to W. Denis Kendall, American M.A.R.C. president, the new financing acquired by the corporation through Mr. Davis' investment, will enable the company to embark immediately on an expanded production schedule to meet a sizeable backlog and prepare for considerably larger orders in negotiation with military and government departments here and abroad."

Industrial Engine Plant

Plans to build a 500,000 sq ft Industrial Engine Plant were announced recently by H. S. Eberhard, president of Caterpillar Tractor Co. The Peoria firm also announced its intention to construct a multi-building Research Center and a General Offices Building. All three facilities will be located on a 1,100-acre site 12 miles north of downtown Peoria. Site preparation for the Industrial Engine Plant is scheduled to begin within the next few months and construction dates for the Research Center and General Offices building will be established after planning and necessary engineering work have been completed. Operations will begin during 1958 and 1959 in the new area.

Construction of these facilities will be an important part of the Company's over-all building program—the total cost of which is estimated in excess of $200 million for the next three years. It is expected that approximately 3,500 people will be employed in the new area when all facilities are completed. Of this number of people, about 1,200 will be employed in the Industrial Engine Plant. Mr. Eberhard said that the expansion plans reaffirm a theme established by Caterpillar that the company has one goal: "To concentrate the capabilities, resources and experience of our people and of the world-wide Caterpillar dealer organization on the design, manufacture, distribution and service of job-tested heavy equipment." In commenting on the new Industrial Engine Plant, Mr. Ebehard said: "Four years ago, an Engine Division was established to provide an organization which could concentrate on the many special requirements of the industrial engine business. The results of this move now lead us to construct a new and separate facility in order to provide the Division with maximum flexibility to most effectively serve engine customers."

The new plant will be the source of manufacture for Caterpillar V-type engines ranging up to 650 maximum hp in the current line. The source for all other engines will continue to be the Peoria Plant. Basic engines intended for industrial use will be moved to the Industrial Engine Plant where attachments, specially engineered to equip them for use as industrial and torque converter power units, marine engines or electric sets, will be added. Responsibilities of the Caterpillar Engine Division will include manufacture and purchase of all engine attachments, assembly and testing of the completed engine packages and sale of engines to Caterpillar dealers and manufacturer-customers throughout the United States. Engine sales outside of the United States will continue as a responsibility of the Foreign Trade Group recently announced by the Company. When the General Offices now located on the present site of the firm are moved to the new area, the Peoria Plant manufacturing and other facilities will expand to take over the vacated space. (ITS NEW)

Oil and Gas Power Meeting Exhibitors

As we went to press for the March issue we received the following list of exhibitors who have bought space at the Oil and Gas Power Meeting of ASME, May 20 through 23 at the Kentucky Hotel, Louisville, Kentucky: Alcoa, American Air Filter, American Bosch, Scintilla Div. of Bendix Aviation, Burgess-Manning, Cleveland Graphite Bronze, Commercial Filters, C. Lee Cook, Diamond Chain, Garlock Packing, Hilliard, Illinois Testing Laboratories, International Nickel, Johnson Bronze, Koppers, Massey Machine Div., Miehle-Dexter Supercharger Div., Minneapolis-Honeywell Regulator, Nordberg, Shell Oil, Van der Horst, Wilkening Mfg., Woodward Governor, and Wm. W. Nugent & Co.

There are still a few good exhibit spaces left but they won't last long. For booth reservations contact Ray Schakel, Diamond Chain Co., 402 Kentucky Ave., Indianapolis 7, Indiana.

Manifold For Locomotives

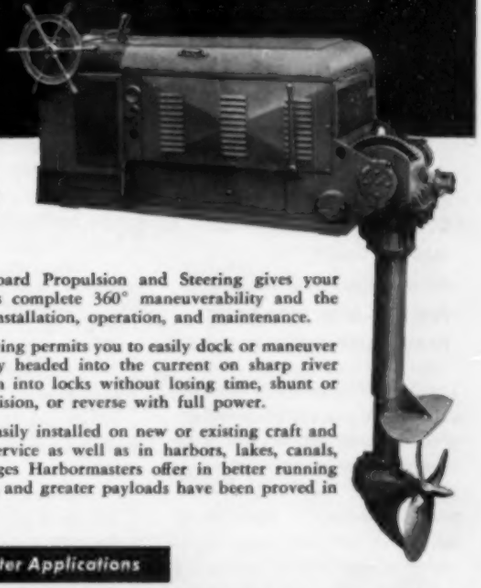
A new uniquely designed manifold for dispersing corrosive diesel locomotive fumes is now ready for the nation's railroads. This manifold is an all-welded construction of rugged type 321 stainless steel supplied by Allegheny Ludlum Steel Corporation to Hanlon & Wilson Company of Wilkinsburg, near Pittsburgh. This type of stainless is noted for its corrosion resistance at temperatures up to 1700°. Hanlon & Wilson, who have designed and made stainless steel mufflers, heaters, and exhaust manifolds for the aircraft industry for more than 16 years, designed the new manifold and are now in production on this item.

J. R. Wilson, president of Hanlon & Wilson, reports that up to this time major railroads which have ordered the new manifolds include the Baltimore & Ohio, the Union Pacific, the Pennsylvania, the New York Central and the Mexican Railroad. Bellows are utilized in this stainless manifold, which expand and contract with the changing temperatures of the exhaust fumes which range up to 1200 to 1300°F. In commenting on this new manifold, J. R. Wilson said, "The new design was worked on for the past three years and modifications were made up to the time we installed the model on the locomotive for the field trials. We believe that we have the best design for this job, and our tests have proven the manifold to be the best in the field."

Field tested for more than 14 months on a Baltimore & Ohio locomotive, the new manifold performed without any down time. Following the road trial the stainless steel manifold, in tests conducted by Hanlon & Wilson engineers, showed no visible signs of corrosion. Diesel locomotive fumes are unusually corrosive to materials used in manifolds, the shroud which surrounds the manifold and the pipes leading from the shroud with the escaping gas. Today's standard manifold is made of cast metal. A slip joint is used to hold the gas in. In the new manifold design a series of bellows work back and forth on sleeve arrangements.

The two sleeve ends are permanently attached with one sleeve overlapping the other. The bellows expand and contract but allow no gas to escape. This is the secret of the new design, along with the use of stainless steel as the material which makes the new design possible. The stainless steel manifold and shroud weighs 460 lbs.

Harbormasters give you rugged Power with Outboard Maneuverability and Economy



Models from 40 to 400 h.p. Gas or Diesel

Harbormaster Outboard Propulsion and Steering gives your craft rugged power plus complete 360° maneuverability and the advantages of low cost installation, operation, and maintenance.

Propeller thrust steering permits you to easily dock or maneuver in crowded quarters, stay headed into the current on sharp river bends or in tide rips, run into locks without losing time, shunt or pick up barges with precision, or reverse with full power.

Harbormasters are easily installed on new or existing craft and are ideal for coastwise service as well as in harbors, lakes, canals, and rivers. The advantages Harbormasters offer in better running speeds, shorter trip times, and greater payloads have been proved in all types of operations.

Typical Harbormaster Applications

Tow "Carpolis"

Ferry "Balfour"

Harbor Boat "Papoose"

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Mid-Continent Diesel News

By Jack F. Cozier

CHARLIE Anderson Construction Co., McAlester, Okla., bought an International TD-18 tractor from the Clarence L. Boyd Co., Tulsa, Okla. The unit will be used for work on the access road to the new Eufala dam.

LOFFLAND Drilling Co., Tulsa, Okla., took delivery on four Unit upper basic machines to be used for offshore drilling purposes. The units were sold by Midwestern Engine & Equipment Co., Tulsa, and are powered by GM3-71 diesel engines.

HARRIS Construction Co., Norman, Okla., has purchased a Cat D6 tractor and bulldozer for oil field development work near Lindsay, Okla. The sale was made by McCormick Machinery Co., Tulsa, Okla.

DENTON Construction Co., Tulsa, Okla., has bought a Bucyrus-Erie 22-B back hoe powered with a GM 3-71 diesel engine from Butler-Sparks Equipment Co., Tulsa, for use on local sewer work.

WILLIAMS Brothers, Costain & John Brown, Tulsa, Okla., purchased four Insley K-12 cranes powered by Cat diesels and mounted on Crane Carrier units along with two Insley ¾ yd back hoes crawler mounted for pipe line work in Turkey. The sale was made by Tulsa Equipment Co., Tulsa.

HOUSTON Contracting Co., Houston, Tex., has taken delivery on an Allis-Chalmers HD-16 tractor with Tractomotive side booms from the Boardman Co., Tulsa, Okla. The unit will be used for pipe line construction.

R. G. MORGAN, oil field contractor, Borger, Tex., added another D6 tractor with hydraulic bulldozer to his fleet of Caterpillar tractors from West Texas Equipment Co., Amarillo, Tex.

BRISCOE Construction Co., Stillwater, Okla., bought a Cat D6 tractor and bulldozer for state highway construction and paving work. The sale was made by McCormick Machinery Co., Tulsa, Okla.

HASKELL Lemon Construction Co., Oklahoma City, Okla., has purchased an International TD-18 tractor for work on the Will Rogers turnpike. The sale was made by the Clarence L. Boyd Co., Tulsa, Okla.

PARTON & Parton, Henrietta, Okla., has bought a Cat D7 tractor and bulldozer from McCormick Machinery Co., Tulsa, Okla., for PMA and SCS work.

W & E Construction Co., Tulsa, Okla., has received an American 600 tractor powered by a Continental diesel engine for paving contract work. The sale was made by Tulsa Equipment Co., Inc., Tulsa.

M & N Trucking Co., Nowata, Okla., purchased a Cat D7 tractor and bulldozer for oil field development work. The unit will be delivered by McCormick Machinery Co., Tulsa, Okla.

CURRY Materials Co., Idabelle, Okla., has bought a type 34 Lima drag line from R. A. Young & Son, Inc., Tulsa, Okla. The unit is powered by a GM 4-71 diesel engine.

CURRY Construction Co., Antlers, Okla., bought a Cat #12 diesel motor grader for use in surfacing contract work from McCormick Machinery Co., Tulsa, Okla.

KAY COUNTY, Newkirk, Okla., purchased an Allis-Chalmers HD-6G loader for material handling and highway construction. The sale was made by the Boardman Co., Tulsa, Okla.

HARVEY Burton, Collinsville, Okla., has received a Cat D4 tractor and bulldozer from McCormick Machinery Co., Tulsa, Okla., for oil field construction work.

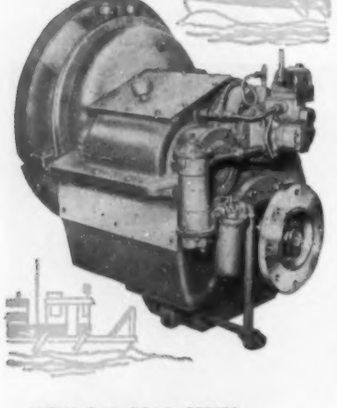
NOBLE County, Perry, Okla., bought an Allis-Chalmers HD-11 tractor and bulldozer from the Boardman Co., Tulsa, Okla., to be used for county highway construction.

W. G. BURGESS Co., Tulsa, Okla., has purchased a Cat 955 Traxcavator from McCormick Machinery Co., Tulsa, for highway construction work.

Literature on Control Panels

Kato Engineering Co. has announced the availability of a new brochure on generator control panels for diesel generator sets. This literature gives details of construction of Kato heavy duty panels and shows illustrations of various applications. For a copy of this bulletin, write Kato Engineering Co., 1415 First Ave., Mankato, Minn. and ask for Form PAN 1156. ITS NEW

BIG STORY IN MARINE TRANSMISSION



NEW S-N 3900 SERIES REVERSE-REDUCTION MARINE GEARS ENGINEERED ESPECIALLY FOR THE NEW HIGH-SPEED HEAVY-DUTY DIESEL ENGINES

The S-N 3900 gears match and complement every major diesel engine improvement to give your boat the finest in maximum power transmission. They embody simplicity in design . . . equal life at full power with full speed transmitted either ahead or astern . . . no clutch adjustment necessary. All accessories are outside gear housing and easily removed for service. There is a wider choice of gear ratios for greatest efficiency. Two new models are now available in the 200 to 800 HP range. See your S-N distributor or write for further information.

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FOR HALF A CENTURY
"MAKERS OF JOE'S GEARS"
THE SNOW-NABSTEDT GEAR CORP., HAMDEN, CONN.

With over one hundred Quincy Authorized Service Depots across the country, you are never far from the factory parts you may need for *any* Quincy Compressor. And experienced Quincy service people know the importance of 'round-the-clock air power on your job, so you can be sure they'll follow through when you specify "fastest way."

Quincy makes a compressor for every diesel, marine, oil field and industrial use from 1 to 90 CFM. Write Dept. K-54 for descriptive catalog today.

Quincy COMPRESSORS
FOR LOW COST AIR POWER
QUINCY COMPRESSOR CO., QUINCY, ILLINOIS

West Coast News

By James Joseph

TO MORRISON Knudsen Co., Boise, an Allis Chalmers model 4B-153 starting engine replacing electric starting on a Bucyrus-Erie 54-B shovel. Sale via Portland's Hamilton Engine Sales, Inc.

C. A. ZIMMERMAN, Portland, recently launched an all steel 30-ft river boat built by Portland's Albina Engine and Machine Co. Boat draws 30 in. of water, is to engage in log salvage on Columbia and Willamette rivers. It's powered by two 6DAMR-273 Buda diesels working thru Capitol hydraulic reduction gears.

SOLD to Erickson Plumbing and Heating, Puyallup, Wash., a Fairbanks-Morse 49A4½, 3 cylinder enclosed diesel engine.

FOR SAN Francisco's Oswald Machine Works, a Fairbanks-Morse model 45, 10½ hp basic power unit.

WESTERN construction men are eyeing with interest the incorporation of water-cooled exhaust manifolds on Caterpillar D375 and D397 turbocharged engines. Los Angeles' Shepherd Machinery Co. say the manifolds help reduce engine room temperature and fire hazard.

TO REPOWER one of his several draggers operating in Newport, Oregon, Mr. Speed Hall has taken delivery of a new Buda 8DAMR-1125 diesel with Capitol 3.88 to 1 reduction, hydraulically actuated.

AS STANDBY in the Beverly Hilton Hotel, Beverly Hills, Calif., a diesel generator set, its General Motors 6-71 engine directly connected to a 100 kw Delco generator, model YI-698. Sale by Salyers Equipment Co.

TO GILMORE Skoubye, Oakland, Calif., a Fairbanks-Morse Model 49, 2 cylinder, 40 hp diesel engine.

FOR SAN Rafael, Calif's Marin Municipal Water District, a Fairbanks-Morse 45B4-⅛, 10½ hp diesel unit.

HOYT BROS., Philomath, Ore., recently repowered their BU-75 yarder with an Allis Chalmers 6DA-779 diesel, replacing a gas engine. Yarder has heavy duty Skagit transmission.

ON THE line as scheduled: eight 2000 hp Ingersoll-Rand turbocharged gas-engine driven compressors, as Southern California Gas Co.'s revitalized Ducommun street compressor station became operative in Los Angeles.

TO GUY F. Atkinson Co., South San Francisco, a Fairbanks-Morse 6 cylinder, 138 hp, Model 49 diesel engine.

INTERNATIONAL Missionary Supply, Redwood City, Calif. has taken delivery of a 3 cylinder, 90 hp, Fairbanks-Morse model 49B4½ standard open power unit.

FOR SALT Lake City's Motor Mercantile Co., a Buda 6DAS-844 for repowering an Allis Chalmers TS-300 rubber-tired earth mover. Sale thru Hamilton Engine Sales, Inc., Portland.

HALE BROS. Logging Co., Springfield, Ore., has repowered their BU-125 Skagit with a Buda 6DAS-844 (280 hp at 2100 rpm). Machine operates high and rugged McKenzie River area, and has Western Gear transmission.

TO WRIGHT Manufacturing Co., Phoenix, Ariz., to repower a GMC tractor, a 175 hp Model JT-6 Cummins turbodiesel engine.

FOR GLASGOW Air Force Base, Montana for stand-by emergency service, four generator sets of 5 to 30 kw, all with Buda engines sold by Ace Electric Co., Portland, Ore.

TO MC KAY & Carlen, Raymond, Wash., a Cummins diesel to repower a 22-B Bucyrus-Erie shovel.

SOLD to General Service Administration, Seattle, a Model 48AG-3½, 4 cylinder, 28 hp Fairbanks-Morse diesel generating set.

TO AMERICAN Independent Oil Co., San Francisco, a Fairbanks-Morse 6 cylinder model 49B4½, 133 hp diesel generating set.

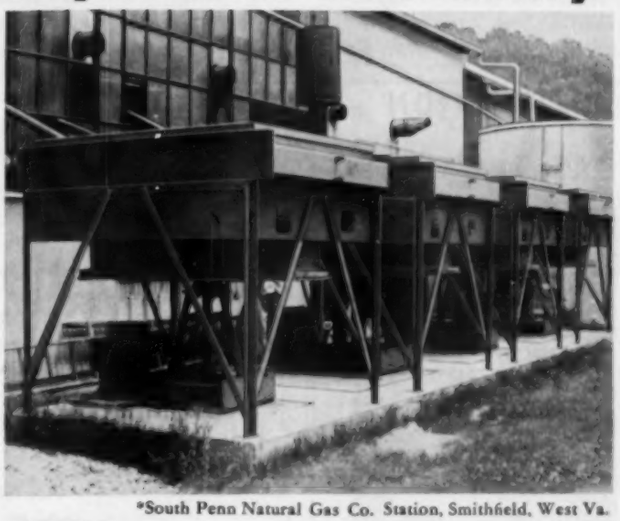
GE Locomotives Purchased

The Costa Rican government has purchased 14 diesel-electric locomotives from General Electric for a total of about $1,300,000. The new units will replace 34 older steamers to provide mainline passenger and freight service between the Port of Limon on the Caribbean and the capital city of San Jose. When the new locomotives are put into service, sometime next spring, the railroad will be almost completely dieselized.

The new units are duplicates of 4 locomotives furnished this railroad a year ago. They were built by General Electric's Locomotive and Car Equipment Department here, and sold through International General Electric. Rated at 52 tons and 500 hp, each will have two narrow gage two-axle, side-equalized swivel trucks. The cab arrangement is of the switcher type.

Young Engineering Talent

Pays off for Gas Utility*

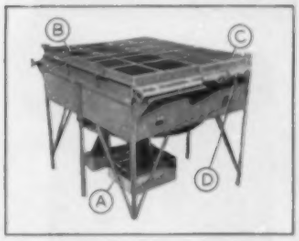


*South Penn Natural Gas Co. Station, Smithfield, West Va.

Young "HC" Atmospheric Radiators

eliminate cooling water supply problems

The Problem: To replace an old cooling tower serving gas compressors. A nearby creek furnished the uncertain water supply.



Young HC Horizontal Core Cooler and Condenser

How Young solved it

Four Young Radiator Company HC Atmospheric Radiators were specified to cool four 165-hp compressor engines. Natural gas is compressed from local field lines and well-head to pressures suitable for shipping to distant sales points. Installation of the Young Units has modernized the compressor cooling system. In addition it has made the utility independent of the uncertain water supply.

A. Independent mounted fans eliminate unit vibration.
B. Coils designed for easy access to tube ends.
C. Coils supplied for any operating pressure.
D. Steel tanks treated for corrosion resistance.

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Put Young Talent to work for you . . .

Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.

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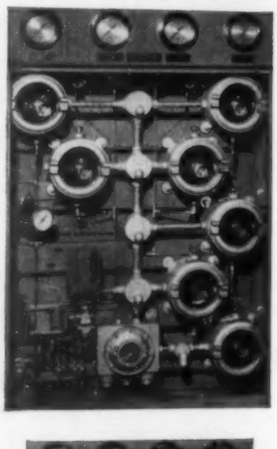
Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY
Heat Transfer Products for Automotive, Aviation and Industrial Applications. Heating, Cooling, Air Conditioning Products for Home and Industry.
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

New Orleans News

By A. Bradfield

EDDIE Portie of Buras, La., has in operation a 35 ft Roy Breaux twin screw crewboat called the *Gary*, which is powered by two 4071B GM diesel engines. The purchase was made from George Engine Company, Inc., Harvey, La.

PROTECTION
for
GAS TURBINES



MERCOID
SAFETY CONTROL
PANELS

Illustration above is a typical custom made explosion proof Mercoid Safety Control Panel which safeguards Gas Turbines by providing the following control functions:

Clutch pressure • High pressure lube oil • Axial compressor discharge • Bearing lube oil pressure • Fuel supply pressure • Overspeed pressure • Impeller pressure • Starting turbine throttle pressure • Lube oil high temperature • Exhaust temperature shutdown • Exhaust temperature alarm.

There are many more safety functions Mercoid can provide—our engineers will be pleased to offer their recommendations on the proper application of Mercoid Safety Controls for your gas turbines.

Write for details

THE MERCOID CORPORATION
4201 Belmont Ave., Chicago 41, Ill.

TO RE-POWER one of his tugs, the *Agnes B*, George W. Buras of Harvey, La., recently purchased three model 60-61A GM diesel engines furnished by George Engine Company, Inc., of Harvey, La.

TWO George Engine Company, Inc. ACH-30 generator sets and two model 122206 GM marine diesel propulsion engines were delivered recently to American Marine Corporation of New Orleans, La., to be installed in their American Marine Hulls. Sale by George Engine Company, Inc.

W. P. Stuart of Buras, La. added the *Marsh Lady*, a 31 ft Sewart Seacraft single screw cruiser, powered by one 6071A GM diesel engine, to her fleet. Diesels and cruiser sold and delivered by George Engine Company, Inc., Harvey, La.

GEORGE Engine Company, Inc., Harvey, La., has sold and delivered a 32 ft Roy Breaux cruiser called the *Jimmy R.* to J. Ray McDermott & Co., Inc. of Harvey, La. The *Jimmy R* is powered by a model 6071B GM diesel engine.

TRIPOD Boat Company, Inc. of Berwick, La., purchased a 48 ft Sewart Seacraft cruiser powered by two GM diesel standard turbopower marine propulsion engines, one 6122T and one 6123T, from George Engine Company, Inc., Harvey, La. This vessel was named the *Trident*.

THE *Bobby R.*, which was built by Roy Breaux's Shipyard of Loreauville, La., and powered by a model 6071B GM diesel, is the latest purchase of J. Ray McDermott Co., Inc., Harvey, La. The boat and engine were purchased from George Engine Company, Inc., Harvey, La.

GEORGE Engine Company, Inc., of Harvey, La., has recently sold and delivered to Henry Tarleton Ballou of Rockport, Texas, a 31 ft Sewart Seacraft sedan cruiser called the *Miss Terri-B*. This vessel is powered by one model 6071A GM diesel engine also sold by George Engine Company, Inc.

TO RE-POWER one of his 34 ft Half Cabin Cruisers, Hewitt John Gautier recently purchased two model 3071C GM diesel marine engines furnished by George Engine Company, Inc. of Harvey, La. The vessel re-powered is the *Miss Martha*.

GEORGE Engine Company, Inc. of Harvey, La. again delivers. On this occasion to W. P. Stuart of Buras, La. a 40 ft Star Marine Manufacturing Company crewboat called the *Lorene*, and powered by two model 6071A GM diesel propulsion engines.

PONCHATOULA Tow Boat Company of Hammond, La., has acquired a 60 ft William F. Wilson twin screw tug which is powered by two 62206 GM diesel engines. George Engine Company, Inc., Harvey, La. sold same. Ponchatoula Tow Boat Company calls this one the *Ponchatoula*.

THREE model ACHI50 GM diesel driven generator sets were purchased by Magnolia Petroleum Company of Dallas, Texas, and delivered to Avondale Marine Ways, Inc., at Avondale, La. to be used on a job being constructed at Avondale. This sale made by George Engine Company, Inc. of Harvey, La.

NORTH Shore Boat Company of New Orleans, La. recently purchased the *North Shore*, a 40 ft Sewart Seacraft twin screw crewboat which is powered by two model 6071A GM diesel engines, from George Engine Company, Inc., of Harvey, La.

FAGAN, Fagan & Archibald of Marrero, La. have acquired the *Miss Kim*, a 58 ft Harvey Canal Shipyard twin screw steel tug, which is to be powered by two model 62206 GM diesel engines. Sale by George Engine Company, Inc., of Harvey, La.

Roller Chain Sprockets

The Morse Chain Company is now manufacturing a stock line of double strand roller chain sprockets for American Standard chain in pitches ½ in., ⅝ in., ¾ in. and 1 in., using the taper lock hub and bushing principles. When using taper lock on these greater capacity drives, it provides the equivalent of a desirable interference fit on all shafts regardless if they are undersized by machining, special finishes or standard mill tolerances.

Taper lock furnishes easy on, easy off feature, eliminating damage to bearings and machinery. For service, it has the availability of many bore sizes direct from stock or distributor shelves. It eliminates reworking, yet requires no more shaft space than any other sprockets. With screws recessed on assembly, it presents a neat appearance and contributes to overall safety. This line will be carried in conjuction with the standard single Morse Taper Lock Sprockets and is a step in the ever increasing quantity of power transmission products by the Morse Chain Company of Ithaca, New York. (ITS NEW)

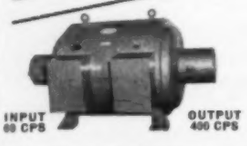
Silencer Catalog

The complete line of Kittell industrial, mobile and marine silencers including many new models is described in detail in the new 1957 Kittell catalog now available from the manufacturer. Consisting of 24 pages, the new Kittell catalog provides dimensions, design principles, application photographs, and other data needed to specify Kittell Silencers. (ITS NEW)

KATO THE GENERATOR THAT FITS THE ENGINE OF YOUR CHOICE!

CHOICE OF FLEXIBLE COUPLINGS

ADAPTABLE TO ALL ENGINES WITH SAE BELL HOUSINGS



INPUT 60 CPS

OUTPUT 400 CPS

There is a size in the Kato line of generators with the electrical characteristics to meet your specific requirements. They hook up with any standard industrial diesel or gasoline engine by means of one of Kato's flexible couplings. All standard frequencies . . . 25-50-60 and 400 cycles plus many special frequencies to 1200 cycles (both fixed and variable). Now 400 cycles to 250 KW. 60 cycles to 500 KVA. One or two bearing designs. Extra lead wires brought out insure a maximum voltage selection.

MOTOR GENERATOR SETS

Wide variety of both fixed and variable frequency ranges starting at 25 cycles, up to 1200 cps. 400 cycle line now up to 250 KW.

Builders of Fine Electrical Machinery Since 1928

SPECIAL ORDERS WELCOMED!

KATO *Engineering Company*

WRITE TODAY FOR FOLDER IT'S NEW! PHONE 5831
1443 FIRST AVE. MANKATO, MINNESOTA

Kenworth Sales Manager

Appointment of Lewis T. Gerlach as general sales manager of Kenworth Motor Truck Company is announced by R. D. O'Brien, Vice President and general manager of the Seattle truck manufacturing firm. Gerlach succeeds O'Brien on the latter's advancement to general manager. Serving as assistant general sales manager in charge of distributor sales since July, 1955, Gerlach has been with Kenworth continuously for nearly 21 years.

He joined the staff in May, 1936, as a member of the payroll department. The following year, he was assigned to truck costing, special estimates and customer contacts. He was transferred to purchasing materials for military vehicles built by Kenworth during the Second World War. Since the war, he has worked primarily in sales engineering. A number of special assignments have been handled by Gerlach, including the preliminary studies preceding construction of the Canadian Kenworth, Ltd., manufacturing plant at Vancouver, B. C. He also has represented Kenworth in Washington, D. C. Born in Douglas, Wyoming, Gerlach has resided in Seattle since 1932.

Flareless Tube Fitting

Hi-Seal, a new type of flareless tube fitting introduced by the Imperial Brass Mfg. Company, Chicago, Illinois, makes a good, butt-tight joint and is designed for a full range of pressure conditions. Since a butt-joint is formed and there is no tube entry into the body of the fitting, tubing need not be sprung when making assemblies. This important feature is particularly advantageous when working with short lengths of tubing and with large-sized, heavy wall or hard-temper steel tubing, all of which are difficult or impossible to spring. Available in steel or stainless steel in a variety of sizes, the Hi-Seal fitting consists of a body, nut and alloy steel sleeve. It is engineered to withstand high pressures, hydraulic surge, vibration and other severe operating conditions. No flaring or threading of tubing is required in making assemblies.

A shoulder on the sleeve prevents incorrect assembly even by inexperienced personnel. Three serrated edges on the sleeve bite radially into the tube surface to a controlled depth, making a triple seal. It will not move longitudinally in assembly, scrape or shave tubing, and there is no torquing of the tube when making a joint. The Hi-Seal fitting permits close tube bends, the manufacturer points out, and may be disconnected and reconnected as often as desired and still maintain a positive seal. The fitting is available in a wide variety of types and shapes, in sizes for ⅛ to 1½ in. O.D. tubing. It is furnished with long Dryseal Pipe Threads, or with straight threads with O-Ring seal. Complete details about Hi-Seal Fittings are outlined in Bulletin 3061, which may be obtained upon request from the Imperial Brass Mfg. Co., Dept. HSF, 1200 Harrison Street, Chicago 7, Illinois. (ITS NEW)

Catalog Of Small Diesels

A new catalog of small diesels has been issued by American MARC, Inc., of 1601 West Florence Ave., Inglewood, California. Last year this company purchased the Diesel Engine Division of the Hallett Manufacturing Company and are producing an improved line of Hallett low-horsepower, lightweight air-cooled engines. The new 30-page catalog gives full data and specifications of the complete line of American MARC-Hallett engines; and in addition, contains much information of interest concerning small diesels in general.

Spearheading the long line of engines and power units packages for various applications are American MARC's Big 4 Models AC-1 and AC-2, 5-½ and 13 bhp air-cooled diesels, and Models WC-1 and WC-2, the water-cooled equivalents. Complete specifications are given on twenty basic American MARC prime movers and conversions, including portable and stationary generating plants for home, farm, boat, industrial, and military use; centrifugal pumping plants of various capacities; marine units, and diesel engines for many other purposes. Also included are full installation data and profile drawings, performance curves, complete lists of available attachments and accessories, and a detailed discussion of air-cooled small diesels. (ITS NEW)

To New Advertising Post

The appointment of Robert V. Lundskow as assistant to the director of advertising of Eaton Manufacturing Company was announced recently by R. H. Gale, director of advertising. For the past three years Mr. Lundskow has been in charge of advertising and promotion for the Dynamatic Division of the company in Kenosha, Wisconsin. "Mr. Lundskow's fine record in various executive capacities since he joined the Dynamatic Division and his advertising experience make him particularly qualified to assume his new responsibilities," Mr. Gale said.

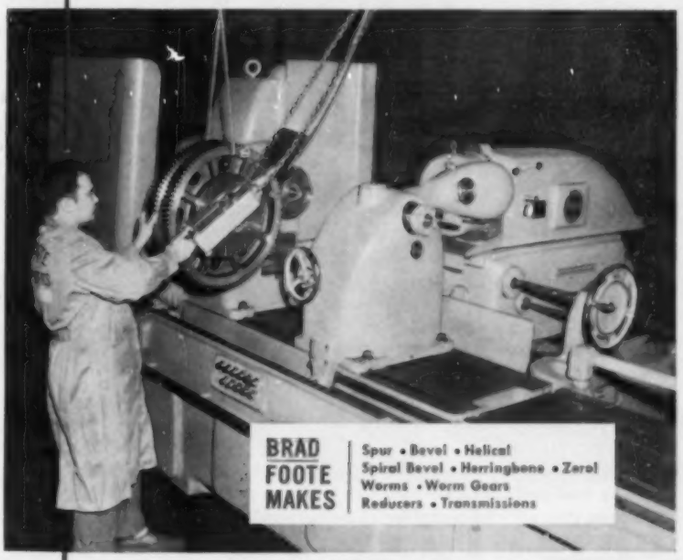
Born in Kenosha in 1918, Mr. Lundskow attended the public schools there and studied mechanical engineering at the University of Wisconsin prior to joining the Dynamatic Division. He is a member of the American Institute of Electrical Engineers and is on the board of trustees of the Independent Good Government Organization in Kenosha. Mr. Lundskow now resides at 1828 74th Place, Kenosha, Wisconsin with his wife, Alice, and their three-year-old son, Robert Peter. He plans to move his home to Cleveland soon after assuming his new duties next month.

NOW AVAILABLE! The Completely new Volume 21 of **DIESEL ENGINE CATALOG.** This giant, fully illustrated reference book containing complete and detailed engine and accessory sections is bigger, better than ever before. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Orders are being accepted for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company order forms to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, California.

SPECIAL MACHINES —MEN

2 Reasons Behind Brad Foote Quality

• The craftsman shown below is loading a gear into one of the latest additions to BRAD FOOTE'S long list of special-purpose machines. The only one of its kind in existence, this new shaver can straight or crown shave gears up to 51" in diameter. Normally accommodating gears with shafts up to 142" between centers, it can handle even longer shafts by using special journals. Specially designed, the new machine will shave either internal or external gears.



• Costly special machines such as this are important in providing the extra quality at lowest cost which is the hallmark of BRAD FOOTE gears. But these are only part of the story. Even more important, perhaps, are the men who man these machines—experienced craftsmen with long experience in producing gears to meet the most exacting and specialized requirements.

• BRAD FOOTE'S facilities are at your disposal whether you need one gear or a long production run. We would sincerely appreciate an opportunity to discuss your requirements or quote on your specifications. Your inquiry will receive prompt attention.

BRAD FOOTE GEAR WORKS, INC.

1306 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • Olympic 2-7700 • TWX: CIC-2856-U

subsidiaries
AMERICAN GEAR & MFG. CO. Phone: Lemont 920 Lemont, Illinois
PITTSBURGH GEAR COMPANY Phone: SPalding 1-4600 Pittsburgh 25, Pennsylvania

District Managers

E. Weston Hammond has been appointed District Manager of the Worthington Corporation Los Angeles District Office, effective January 1, according to a recent announcement by W. A. Meiter, corporation General Sales Manager. Formerly Assistant Manager of the Los Angeles District Office, Mr. Hammond will replace J. G. Murphy who has been appointed Special Representative. A graduate of the Massachusetts Institute of Technology where he obtained a BSME degree, Mr. Hammond joined Worthington in 1922 as a Student Engineer at the corporation's Buffalo Division. Prior to his appointment as Assistant Manager of the Los Angeles District Office in 1951, Mr. Hammond had served as Distributor Supervisor of the Air Conditioning and Refrigeration Division.

J. R. Matullo has been appointed District Manager of Worthington Corporation's new Newark District Office, established January 1, it was recently announced by W. A. Meiter, the corporation's General Sales Manager. The new Newark District Office, to be located in the Worthington Harrison Division Administration Building, replaces the former New Jersey Branch of the New York District Office. "The growth of the North Jersey area including Greater Newark over the past decade is recognized by Worthington in its market potentials and has prompted the establishment of this new office," says Mr. Meiter.

A graduate of New York University where he received an M. E. degree, Mr. Matullo had been serving as a General Line Salesman since joining Worthington in 1934 until his appointment last September as Manager of the New Jersey Branch Office. During World War II, Mr. Matullo interrupted his career at Worthington to serve as a Major in the U. S. Army Corps of Engineers. The new Newark District Office will have jurisdiction over Essex, Hudson, Bergen, Passaic, Morris, Sussex, Warren, Hunterdon, Somerset, Middlesex, Monmouth and Union counties in New Jersey; Richmond, Rockland and Orange counties in New York.

THE COMMONWEALTH OF PENNSYLVANIA

Pennsylvania Industrial Development Authority announces

The "Pennsylvania Plan"

100% financing for your new plant

through Pennsylvania's Community-State Building Programs

A message to Manufacturers seeking a New Plant Site

New 25-year, 2% interest Second Mortgage Loans by the Pennsylvania Industrial Development Authority offer unique assistance to community industrial programs*... help "close the financing gap" to assure *low cost 100% financing of your new plant building in Pennsylvania.*

Added to commercial First Mortgages, plus funds supplied by local communities – these new loans can reduce demands on your working capital for a new industrial structure.

Over 70 Pennsylvania communities now have fund raising experience in the organizing and capitalizing of industrial buildings. Several plant shells are ready for completion.

As a businessman, you work directly with these communities and private lending agencies.

You specify plant construction details. You have the choice of purchase, lease-purchase or straight leasing arrangements on highly attractive terms. You select the type of community that best suits your location requirements.

**110 community-sponsored industrial plants constructed in Pennsylvania since 1945.*

100% FINANCING AT A GLANCE

How P.I.D.A. 2nd Mortgage Funds "close the financing gap"... encourage sound investment by private capital:

Industrial Plant Construction Costs –

Subscribed by local non-profit community-sponsored builder-owner corporations. 20%

2nd Mortgage Loan, Pennsylvania Industrial Development Authority. 30%

1st Mortgage Loan obtained from banks, insurance companies and similar lending institutions. 50%

Total financing, secured through local subscriptions and mortgage loans, *without cash investment by the manufacturer.* 100%

MORE DATA ON P.I.D.A. 2ND MORTGAGE LOANS

Minimum interest rate, 2% per annum.

Maximum term, 25 years.

Available on up to 30% of industrial plant construction costs.

Made to non-profit community corporations organized to encourage local industrial development. The Authority does not engage in direct construction or ownership.

Limited to Labor-Surplus Areas... assuring a plentiful supply of skilled labor, high productivity, low labor costs ... from stable, permanently-rooted small town people.

For free copy of "Plant Location Services" pamphlet, or for more details on 100% financing, write or call: Pennsylvania Department of Commerce
Pennsylvania Industrial Development Authority
Main Capitol Building, 507 State Street
Harrisburg, Pennsylvania
Phone: CEdar 4-2912

"Plant" your business in Pennsylvania and prosper!

Steel Tube Fittings Catalog

The publication of a new 48-page Steel Tube Fittings Catalog is announced by The Weatherhead Company, Fort Wayne Division, Fort Wayne, Indiana.

The new catalog incorporates complete engineering data on Weatherhead 7000 Series and 8000 Series Ermeto hydraulic flareless tube fittings and Weatherhead Flare-Twin S.A.E. 37° Flare (J.I.C.) hydraulic tube fittings. In addition to complete engineering specifications, a section is devoted to assembly instructions, materials, finishes and operating pressures. Copies are available from Weatherhead industrial distributors or write The Weatherhead Company Customer Service Department, 128 West Washington Blvd., Fort Wayne, Indiana. (ITS NEW)

Boat Yard Superintendent

Kenneth E. Lewis has been appointed superintendent of Dravo Corporation's Wilmington, Del. boat yards, it was announced by P. M. O'Laughlin, operations manager of Dravo's Engineering Works Division. Mr. Lewis, who has been an electrical engineer at Dravo's Neville Island works since March 1952, will report to R. D. Anderson, manager of the Wilmington yards. A 1949 graduate of the University of Pittsburgh, Mr. Lewis also studied at Carnegie Tech in 1952-1953. Before joining Dravo, he was a test engineer for the Army at Fort Monmouth, N. J. for 16 months. He served in the Navy during World War II. He is a member of Eta Kappa Mu and Sigma Tau engineering fraternities.

Automatic Controls Catalog

The Mercoid Corporation has just released their latest catalog of automatic controls listing over 100 items. All controls feature hermetically sealed mercury contacts. Catalog lists controls for single stage pressure, two-stage pressure, differential pressure, single stage temperature, two-stage temperature, liquid level and mechanical movement. Also shown are relays and a complete line of mercury switches. Each control, with accompanying description, specifications and engineering data can be located by a dual index included in the catalog.

ITS NEW

Machining Connecting Rods

A new machine for machining diesel connecting rods has been announced by Greenlee Bros. & Co., Rockford, Illinois. The machine, a three-way, four-station, horizontal, automatic indexing machine, produces 84 rods per hour at 100 percent efficiency. Fixtures are manually loaded with two connecting rods and are mounted on the index table located at the first station. The two rods are then automatically clamped into position by a built-in, air operated torque wrench. Pre-machined centers in each of the rods are used for end-wise location in the fixture. The rods are then automatically indexed from station to station by a hydraulically operated gear and rack mechanism.

Wrist pin holes are drilled and the cap side of the crankshaft hole is bored at the second station. The rod end of the crankshaft hole is bored and the bolt bosses are milled square at the third. At station four, the wrist pin holes are semi-finish reamed while a sawing operation separates the cap from the rod. The rods and caps are, in turn, unloaded at station one. Among other advantages of this machine are a built-in hydraulic system for all stations, (conforming to J.I.C. standards), automatic lubrication and chip disposal. All units are electrically interlocked.

ITS NEW

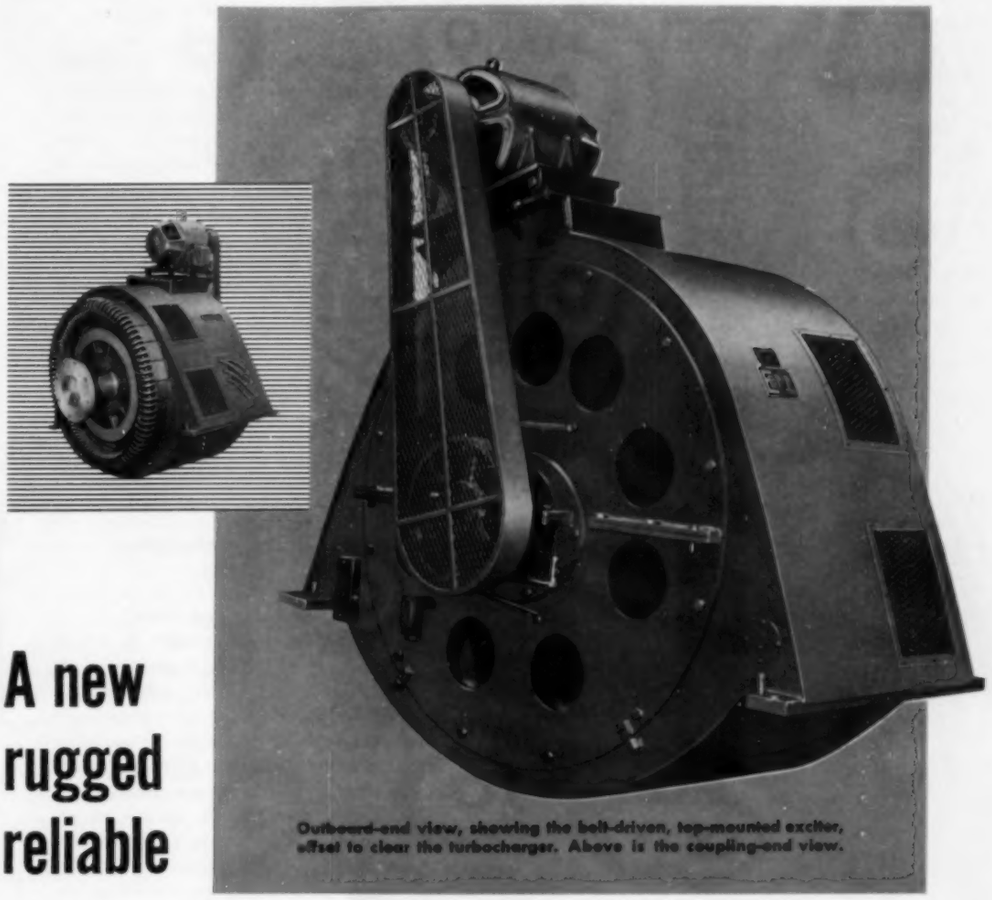
Announces Commercial Batteries

Willard Storage Battery Division has announced a complete new line of storage batteries for truck, bus and diesel applications. With a total of 18 types, the Willard truck bus diesel line features a battery for every use—from ½ ton pick-up trucks to mammoth 50-ton off-highway equipment, and heavy marine service. Foremost in the new Willard line are 2 Super Master types. These are 6-volt types designed for heavy truck and commercial use. Plates of the Super Masters are built with Willard's Silver-Metalex grid alloy which resists battery-killing overcharge and undercharge.

Another Super Master feature is Willard's patented Plate Anchor. Plate Anchor is an exclusive plastic device, inserted between the plate strap and the top edges of opposing plates, which anchors the plates firmly in place, reduces vibration and prolongs battery life. The 12 heavy deluxe types in Willard's truck bus diesel line feature grids made of Metalex, Willard's patented grid alloy that combats grid deterioration. The entire line is designed for lasting and dependable service, with reinforced hard rubber containers, improved temperature-resistant sealing compound, G.O.X. active material for faster starts; and rubber, glass floss or dual insulation depending on duty requirements.

All types in the Willard truck bus diesel line are available charged bone-dry, for factory-fresh power. Most types are available in a variety of terminal plans for all popular applications. Chosen as original equipment by nearly 200 manufacturers, Willard Truck Bus Diesel types are backed by a full written guarantee good throughout the United States and Canada.

ITS NEW



Outboard-end view, showing the belt-driven, top-mounted exciter, offset to clear the turbocharger. Above is the coupling-end view.

A new rugged reliable

ELLIOTT *High-Speed* A-C GENERATOR

Light weight, dependability and ease of maintenance are outstanding characteristics of the new Elliott High-Speed Synchronous Generators. The unit shown above is rated at 1875-kva, 1500-kw, 720-rpm. It is a single bearing, coupled type, with top-mounted exciter.

Elliott FABRISTEEL construction assures maximum strength and rigidity with minimum weight. Maintenance is simplified by split construction of the brackets, large holes for access to collector-ring brushes, removable split-sleeve type bearings and removable screen covers. The bracket is of rigid plate construction, vibration-free yet light in weight, a desirable feature that is appreciated during maintenance operations. The large holes also permit unrestricted flow of ventilating air into the machine. Elliott's extensive experience with high-speed electrical machines is reflected in the design and construction of the rotating parts.

In addition to the type of machine illustrated above, Elliott makes high-speed a-c generators in all ratings and in a large variety of frame enclosures and bearing arrangements.

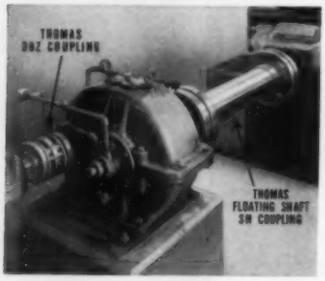
For complete information, consult your nearest Elliott field engineer, or write Elliott Company, Ridgway, Pennsylvania.

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS
CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

ELLIOTT Company

R6-21

THOMAS
FLEXIBLE COUPLINGS
Give You Freedom From Coupling Maintenance



NO LUBRICATION

NO MAINTENANCE

NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

Sterling Engine Sales Manager

E. J. van Dyk

The appointment of E. J. van Dyk of Detroit, Michigan as Sales Manager of the Sterling Engine Company has been announced by W. W. Crittenden, Vice President and General Manager. Mr. van Dyk is an engineering graduate of Wayne University, where he majored in internal combustion engines. Until recently he was with the Detroit Diesel Engine Division of General Motors for whom he travelled extensively in connection with the sale and application of diesel engines. The appointment of Mr. van Dyk is part of current plans to expand the sales program of the Sterling engines which include highly portable 450 to 1000 hp 6 cylinder and 8 cylinder diesel engines with optional turbocharging. The Sterling Company specializes in the manufacture of 1200 rpm direct-drive portable generator sets of from 250 to 600 kw.

In existence since 1903, the company now manufactures the advanced design Sterling Viking engines. Manufacturing facilities have been moved from Buffalo, New York to Menominee, Michigan and sales headquarters are being established in Detroit.

Powder For Crankshaft Rebuilding

A new metal powder developed specifically for rebuilding engine and compressor crankshafts by the metallizing process is now available from Wall Colmonoy Corp., 19345 John R. Street, Detroit 3, Michigan. Anti-friction qualities of the surface produced by the new powder enhance horsepower delivered and give longer crankshaft life according to the manufacturer. Designated Colmonoy C-250, the new material is a high chromium-nickel powder containing chromium borides. It features an unusually low coefficient of friction, controlled surface porosity and good oil retention properties. Each of these characteristics contributes to improvement in wear resistance and service life.

Grit blasting connecting rod journal on a typical engine crankshaft prior to metallizing with new Colmonoy C-250 crankshaft powder.

Colmonoy C-250 powder is recommended for use in the following applications: 1) reclamation of worn or scored crankshafts; 2) modification of crankshafts used in race cars and high performance stock cars; 3) sports car crankshafts; 4) salvage of crankshafts used in high performance marine engines; and 5) compressor crankshafts of all kinds.

The step-by-step procedure for metallizing crankshafts using the new Colmonoy C-250 crankshaft powder is as follows: 1. Degrease thoroughly. 2. Grind required journals (.060 in. to .080 in. undersize on dia.). 3. Grit blast one journal at a time. 4. Plug oil hole in grit blasted journal surface with asbestos rope. 5. Spray one grit blasted journal at a time. 6. Wrap sprayed journal tightly with sheet asbestos. 7. After all journals have been sprayed remove sheet asbestos wrapping; also remove asbestos rope plugs. 8. Wet grind to finish size. 9. Coat journal surfaces with oil or light grease.

Cleanliness and proper grit blasting are of prime importance in the metallizing process. These two factors largely determine the quality of mechanical bond that can be obtained. For this reason, degreasing must be thorough. Grit blasting then spraying one journal at a time insures positive cleanliness and minimizes the possibility of contamination in handling or during storage periods. Wrapping the sprayed journal with sheet asbestos permits slow cooling and a better sprayed surface. Finish grinding is best accomplished with a medium silicon carbide wheel. (ITS NEW)

General Managers

Owen J. Higgins

L. C. Daniels

L. C. Daniels is now general manager of the Buda Division, Tractor Group, Allis-Chalmers Mfg. Company, and Owen J. Higgins is general manager of the Harvey, Ill., Works where the Buda Division's material handling equipment and diesel, gasoline, L P gas and gas engines and generator sets are manufactured.

Daniels succeeds R. K. Mangan, president and general manager, Buda Division, who retired January 1, 1957. Daniels joined the Buda Company as vice president in 1950 after a long career in the automotive industry with truck, bus, tractor and material handling companies. When Allis-Chalmers acquired the Buda Company in 1953, he continued to be responsible for the material handling, industrial and railroad products of the company.

Higgins started with the Monarch Tractor Co., Springfield, Ill., in 1926. This company was acquired by Allis-Chalmers in 1928 and became its Springfield Works where crawler tractors and allied equipment and motor graders are manufactured. He was transferred to the Company's harvesting machine plant at La Porte, Ind., as assistant works manager in 1943 and promoted to assistant general works manager of the Tractor Group in 1950 with headquarters in Milwaukee.

Road Show Exhibit

Eight Cummins Diesels, including three new models, were shown at the American Road Builders Association 1957 Road Show in Chicago's International Amphitheater, January 28 - February 2, by Cummins Engine Company, Inc., Columbus, Indiana. The new models are: (1) an eight cylinder, vee-type 5x5, 375 hp naturally aspirated engine with a 783 cu in. displacement; (2) a four cylinder 4⅛x5, 60 hp, naturally aspirated engine of the Cummins J series, with a displacement of 267 cu in.; and (3) a 375 hp NFT-6 Cummins Turbodiesel engine, with a 5⅛ x 6 bore and stroke and 743 cu in. displacement.

Cut-a-way models (engine with windows) were featured at the Cummins Display of the 335 hp NRTO-6 and the 600 hp VT-12 Cummins Turbodiesel engines. Other engines shown included an NRT-6 powered 100 kw generator set; a JIPS-600 torque converter unit; and a JN-6-IP pumping unit. Background for the engine exhibit was a simple, dynamic abstraction of a modern thruway done in black and white. It was designed by Herbert Matter of New York City.

Unique Diesel Plant

A diesel electric power plant with an electrical output capacity big enough to furnish all of the electricity for an average town of 30,000 people has recently been completed by Stewart & Stevenson Services, Inc. of Houston, Texas. The diesel plant equipment is to be installed by Stewart & Stevenson engineers in a locality so remote that a very unusual and unique job of precision prefabrication was required prior to shipment of the equipment. In fact, the erection of the complete equipment had to be carried out at the Houston plant of Stewart & Stevenson before any part of the final assembled units could be shipped. The cooling system, the exhaust system, the starting equipment and in fact, all of the piping, down to the last nut, bolt and washer, had to be prefitted in Houston so that after arrival at the final destination, the complete power plant facility could be set up and placed in operation utilizing prefitted equipment and tooling incorporated within the shipment.

Not only were there limitations as to assembly, but time also provided another important factor. Stewart & Stevenson engineers had to meet rigid completion schedule and all parts were shipped by air which is no small job when you consider that the power plant consisted of five General Motors Diesel engines of 1500 hp each along with five 1000 kw alternating current generators and the necessary auxiliary equipment required to complete the power plant. Since the project represented a complete Turnkey job insofar as the diesel generator sets were concerned, Stewart & Stevenson had to first design and lay out power plant arrangement, fabricate huge steel sub-bases and unitize as well as test the complete equipment prior to shipment. After complete assembly and test in the plant of Stewart & Stevenson in Houston, each unit was then completely dismantled and boxed in export containers also built by Stewart & Stevenson especially for shipment of the heavy machinery aboard aircraft. This portion of the project is now complete and the 5000 kw power plant is either on location or on its way by special air transportation.

To insure proper installation and erection of the units, there are three specially trained Stewart & Stevenson engineers who will supervise the complete erection of the power plant equipment and place it into service, ready for the important role which it is to play in furnishing vital electric power in a very remote locality. The Stewart & Stevenson engineers will not have the facilities of the elaborate machine shops or other installation aids to draw from in the field. That is the reason that the precision prefabrication was necessary. Everything had to fit and fit right the first time. Stewart & Stevenson cannot at this time disclose the destination of the power plant equipment or the customer involved however, the firm of Stewart & Stevenson Services is well suited to do this all important job because of its backlog of many years of experience in the field of diesels and the handling of difficult assignments where diesel engines and power plants are involved.

Overseas Plant

Establishment of a plant for the manufacture of Cummins diesel engines at Shotts, Lanarkshire, Scotland, has been announced by Cummins Engine Company, Inc., of Columbus, Indiana. The new company will be a wholly owned subsidiary of the Indiana firm, and will be known as Cummins Engine Company, Limited. Cummins officials estimate the total investment at Shotts will approximate $4,000,000 during the next two years for machinery, tools, fixtures, dies, materials and equipment. The greater part of the required machinery will be purchased from United Kingdom sources.

A modern, one story factory building containing approximately 150,000 sq ft has been leased in Shotts, 18 miles southeast of Glasgow. Cummins officials report the plan is to begin production in the new plant in 1957 and to be in full operation in two years. It is expected that the Shotts plant will then give employment to approximately 450 people, and will ultimately employ 800 or more. The Scottish plant is Cummins' first manufacturing facility outside of the main factory in Columbus, Indiana.

D. J. Cummins, who is a Director and Vice President—Engineering of Cummins, will direct operations at the Shotts, Scotland factory. Mr. Cummins has been with Cummins Engine Company, Inc. since it was formed in 1919. In 1943 he was appointed Manager of the Research Laboratory, and in 1945 he became Manager of Quality Control and later Manager of Engineering and Quality Control. Mr. Cummins was elected Vice President—Engineering in 1948, and became a member of the Company's Board of Directors in 1952.

It is estimated that a large percentage of the Shotts plant's output will be sold in the United Kingdom's export market. The export market for Cummins diesels is already well established. During 1955 Cummins diesels were sold in 110 countries. A world-wide dealer network serves 88 countries through 140 sales and service locations outside the United States and Canada. More than 200 locations provide service and sales facilities within the United States and Canada.

SAE President

W. Paul Eddy, chief of engineering operations at the Pratt & Whitney Aircraft Division, United Aircraft Corporation, has been elected president of the Society of Automotive Engineers for 1957, it was announced recently. Mr. Eddy, 56, has been active in local and national programs of the society since he joined it in 1937. He was vice-president in 1955 and is a former chairman of the Southern New England Section which encompasses Connecticut and Western Massachusetts.

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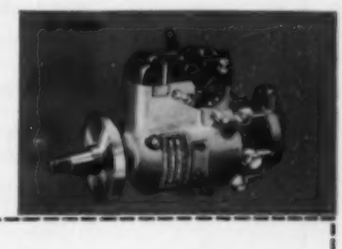

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Volume Twenty-One

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Sales Promotions

Warren A. Thomas

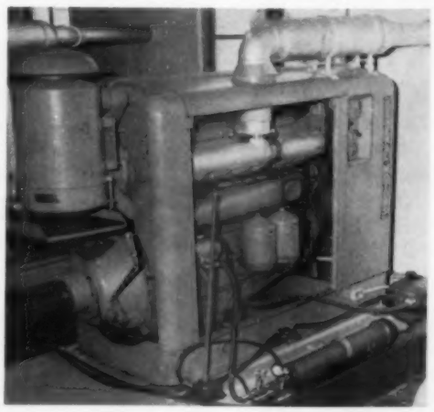
Austin F. Murphy

Promotion of Warren A. Thomas to district sales manager, Chicago region, is announced by Victor E. Rennix, general sales manager of Electro-Motive Division of General Motors. Mr. Thomas, formerly rebuild sales manager, is succeeded in that post by Austin F. Murphy, who has been assistant rebuild sales manager since July 1.

A native of Chicago, Mr. Thomas joined Electro-Motive in 1936 as an assembler in the locomotive division. He served as foreman and service technician assigned to the United States Navy. Following World War II, he became manager of the Diesel Training Center at La Grange and then manager of the statistics and market analysis section of the sales department on December 1, 1949. On March 16, 1951, he became factory branch sales manager and in the following year, manager of the rebuild section of the sales department, the position he held prior to his recent promotion. Married and the father of four children, Mr. Thomas lives at 125th Street and 91st Avenue, Palos Park, Ill.

Mr. Murphy, a native of Hartford, Conn., joined Electro-Motive February 17, 1947, as an operating instructor following 12 years service with the Navy and a year with the Puget Sound Navigation Company as an engineer. He became a service engineer on January 1, 1950, and a sales engineer on January 16, 1952. He was promoted to assistant rebuild sales manager on July 1, 1956, the position he held prior to his recent appointment.

Hydrostarter Installation



Ellis Diesel Sales & Service of Ft. Lauderdale, Fla. has developed a new type of installation for the General Motors Hydrostarters, using a hydrostarter in each diesel but only one oil reservoir accumulator and hand pump for the two or three engines. The above installation was engineered

by George Reynolds sales engineer of Ellis Sales & Service for the Dixie plant of the Ft. Lauderdale Water Works. Two General Motors 6-110 diesels are used for power to drive 2 Allis Chalmers 200 hp 60 cycle motors and 2 Allis Chalmers centrifugal pumps. These emergency units can be depended on for instant starting and supplying over 5,000 gpm of water for the city's water system. (ITS NEW)

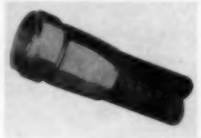
Electrical Engineer Appointed

Albert T. Metcalf

Appointment of Albert T. Metcalf as Electrical Engineer at Nordberg Manufacturing Company, Milwaukee, Wisconsin is announced by Robert E. Friend, Company President. In this position he will assist all product engineering, manufacturing and sales departments and will maintain liaison with electrical equipment manufacturers. Mr. Metcalf is a native of Pennsylvania and a graduate of Lehigh University where he earned a B.S. degree in Electrical Engineering. He also studied power plant operation at Williamson Trade School in Media, Pennsylvania and served in the U. S. Marine Corps. Prior to joining Nordberg, Metcalf spent six years with Anglo-Lautaro Nitrate Corporation of Antofagasta, Chile as Electrical Engineer. Five Nordberg Diesel engines, including two 9600 hp units, are installed in power plants which furnish power for this company's extensive mine, mill and electrified railway facilities.

These operating experiences with a diesel electric power plant, mine, mill and railway provide an excellent background for Metcalf's new duties with the Diesel Engine, Mine Hoist, Crusher, Screen, Process Machinery and Railway Machinery Divisions of Nordberg. Six years of electrical maintenance work at Bethlehem Steel Company also provides Metcalf with experience for his work with the manufacturing departments at Nordberg's Milwaukee and St. Louis, Missouri plants. Mr. Metcalf is an associate member of the American Institute of Electrical Engineers.

Clamp-Type and Reusable Hose Ends



The Weatherhead Company, Fort Wayne Division, Fort Wayne, Indiana, announces a new clamp-type hose end which provides maximum versatility in high-pressure lines for air, hydraulic fluids, steam, couples readily on other types of hose, meets practically any original equipment of field replacement hose-end need, and easily installed according to the manufacturer. It requires no hose skiving or special tools, and may be used over and over. Of malleable iron, this new clamp-type hose end assures free flow and positive, long-lasting seal. Sizes are available in ¼ in., ⅜ in., ½ in., ¾ in., 1 in., 1¼ in., 1½ in. and 2 in. Special features are: cadmium-plated to resist corrosion; clamp halves, size for size, match perfectly; bolt holes assure constant center distances for true lineup of holes; bolt-head hex-shaped recess eliminates need for two wrenches; hose insert prevents restriction of hose I.D.; clamp retainer assures positive grip; all sharp edges are eliminated; bolts are of high-tensile steel.

Weatherhead, also announces a new line of reusable hose ends identified as Model H-69. The new design is particularly suited for use where medium high pressure, cotton covered, single wire braid hose is required. Compact design permits close coupling to conserve space. Threads match S.A.E. and J.I.C. standards, thus eliminating special adapters and complicated hookups. Sizes in the new Weatherhead H-69 hose ends are as follows: Inverted male thread—¼ in. to ⅜ in.; female swivel—¼ in. to 2 in.; rigid male pipe—¼ in. to 2 in. Swivel nuts in the ¼ in., $\frac{5}{16}$ in. and ½ in. sizes will connect to either J.I.C. 37° or S.A.E. 45° fittings. In ⅜ in. size the $\frac{5}{16}$-18 thread will connect to the J.I.C. 37° and the $\frac{7}{16}$-18 thread will connect to the S.A.E. 45° fittings. Swivel-type end No. 8 is 14 pitch (AC811) thread.

The line meets most all requirements as original equipment or for field installations in automotive and industrial applications—air lines, fuel lines, hydraulic lines, grease and oil lines, LP-gas transfer lines and transfer equipment, trucks and buses, materials handling equipment, construction and earth-moving equipment, off-highway vehicles. Prices and engineering data supplied on request. Write F. A. Knapp. (ITS NEW)

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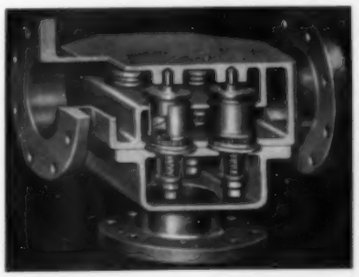

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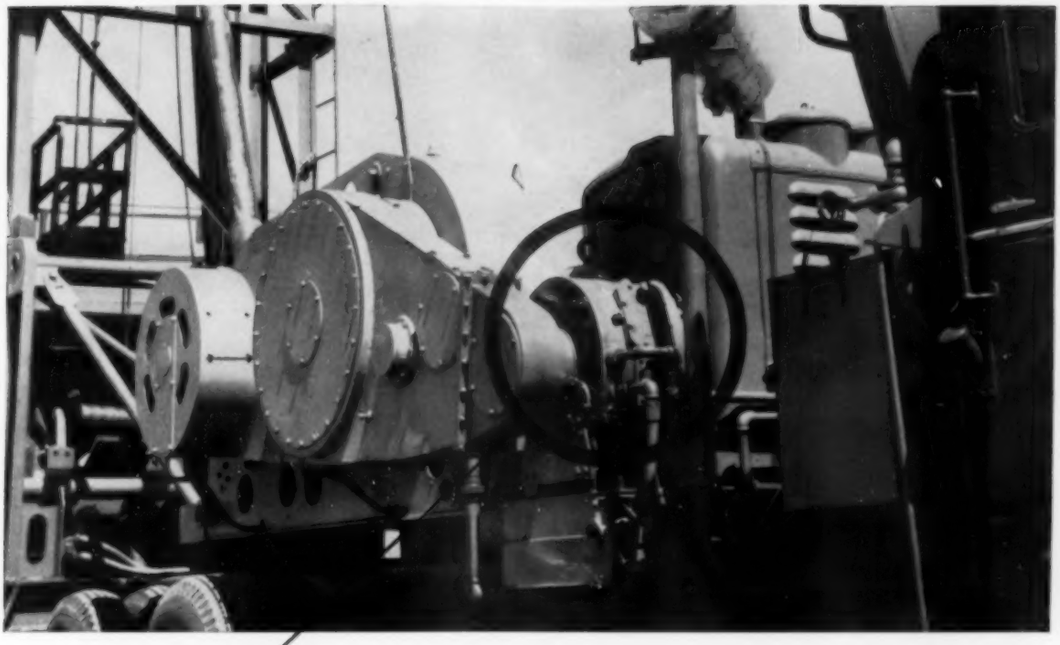

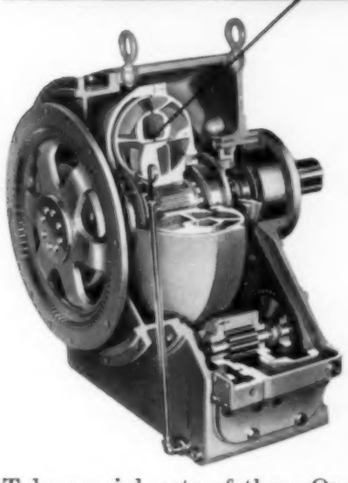

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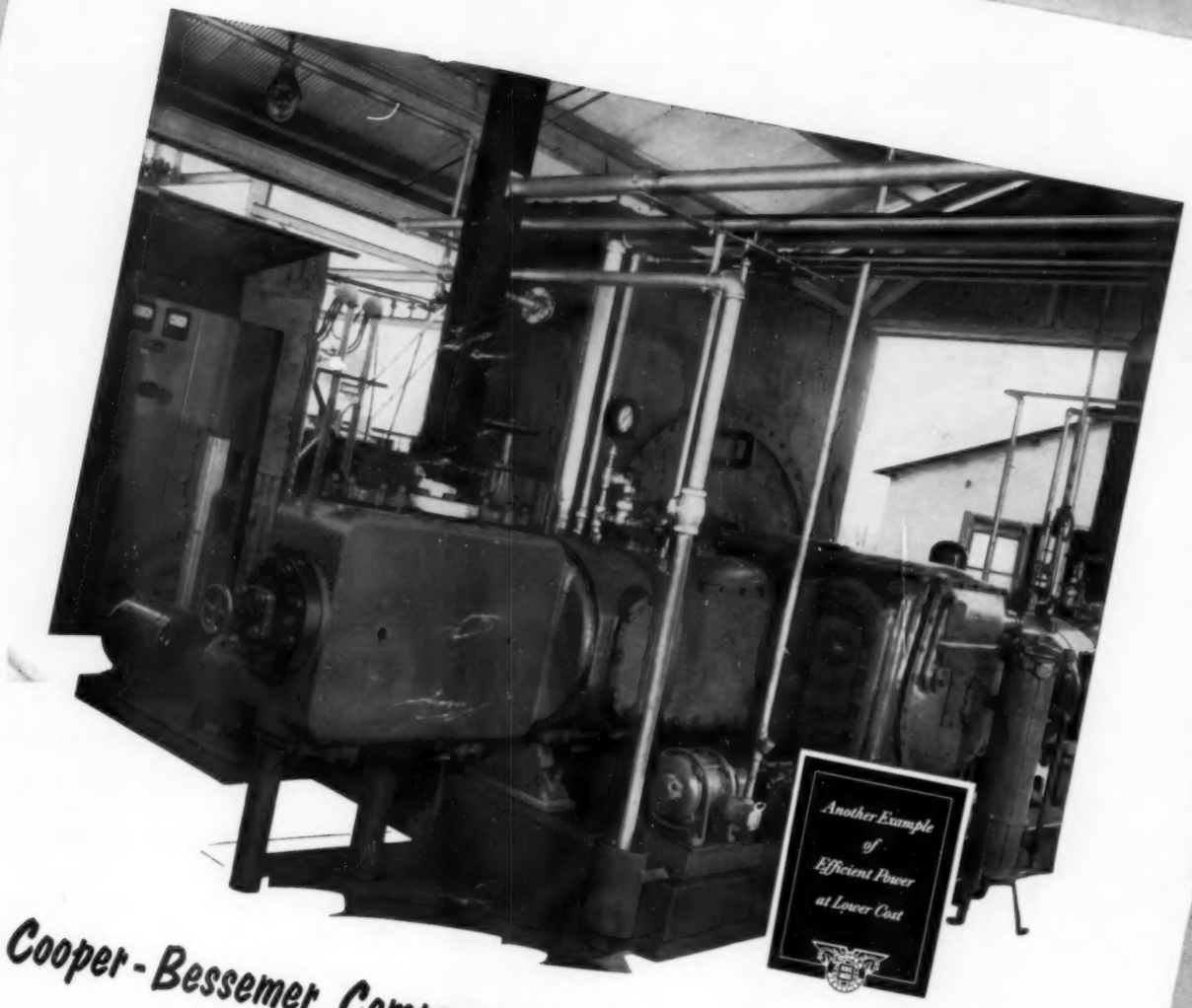

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